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Canada. Interdepartmental
Skilled Manpower Training
Research Committee
Report

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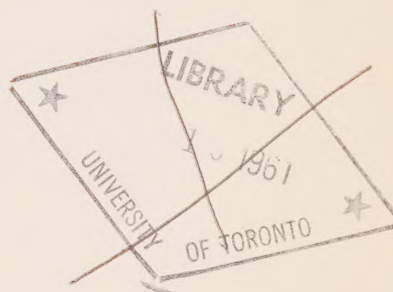
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RESEARCH PROGRAM ON THE
TRAINING OF
SKILLED MANPOWER

No. 7

TRAINING PROGRAMS AND COURSES
FOR
CANADIAN GOVERNMENT
EMPLOYEES

Government
Publications



Department of Labour, Canada,
in co-operation with federal and
provincial government agencies and
other groups

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- No. 3 Technological Changes and Skilled Manpower:
The Household Appliance Industry (1958).
- No. 4 Acquisition of Skills: A Pilot Study of the
Education and Training Background of a Sample
of Tool and Die Makers, Sheet Metal Workers,
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- No. 5A Vocational Training Programs in Canada -
Technical and Trade Training - Publicly Operated
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- No. 5B Vocational Training Programs in Canada -
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- No. 6 Outline of Technical Training in the United
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*Canada. Interdepartmental Skilled Manpower
- Training Research Committee.
Report.*

Research Program on the

Training of Skilled Manpower

NO. 7 - TRAINING PROGRAMS AND COURSES FOR CANADIAN
GOVERNMENT EMPLOYEES

Department of Labour, Canada,
in co-operation with federal and
provincial government agencies and
other groups.

July 1960

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FOREWORD

This report on training programs and courses in federal government departments and agencies deals with the methods and procedures of providing organized or supervised training for persons employed in technical, industrial and clerical occupations at the supervisory and operational levels. It presents the findings of an enquiry undertaken as part of the Research Program on the Training of Skilled Manpower by the Department of Labour in co-operation with other interested federal and provincial departments and with management and labour organizations.

The present report is one of several covering vocational and technical training programs in Canada. The survey was conducted by Mr. A. W. Crawford, under the guidance of a sub-committee of the interdepartmental committee responsible for the complete research program, and was completed in 1960.

The Department of Labour and all officials connected with the planning and conducting of the survey wish to acknowledge their indebtedness to those officials and supervisors in the various departments who furnished the information from which this report has been compiled, and who so kindly offered suggestions and checked the initial and tentative drafts of the reports on each department and agency.



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INTRODUCTION

Purpose of the Survey

The primary objective of this survey was to determine the nature and extent of staff training within government departments, both for the recruitment of new employees and for the development and maintenance of high standards of proficiency. It was hoped that the information given would also indicate the extent to which government departments and agencies draw from and contribute to the pool of skilled workers in Canada, and that it would give some idea of the changes that are taking place in the training of government employees due to technological developments.

Procedure

It was decided to start with the armed forces because they were known to have extensive, well-organized training programs. While this section of the survey was underway, a questionnaire was sent to other federal departments in an effort to learn the extent to which organized or formal training was provided, and to determine in which departments it might be advisable to make more intensive studies of those courses that might contribute materially to the pool of skilled manpower in Canada.

As indicated in Table 1, the replies showed that most departments had several types of organized training programs. It was also apparent that there were wide differences of opinion regarding what constituted formal or organized training. Subsequent enquiry revealed that it would be extremely difficult, and probably misleading, to compile a comprehensive statistical report based on types of courses or training programs. It was also evident that the plan of procedure had to be flexible and subject to change or amendment as the survey progressed.

It was decided, therefore, to complete the survey of trades and technical training in the armed forces and then to proceed with separate studies in six or seven departments which appeared to have training programs of a technical or industrial nature which were directly related to ordinary civilian occupations. It is realized that this procedure does not cover all organized training in federal government departments and agencies, but an effort has been made to include and briefly describe one or more examples of all other methods employed and all other variations in training programs.

TABLE 1
SUMMARY OF REPLIES TO QUESTIONNAIRE
re

ORGANIZED TRAINING IN FEDERAL GOVERNMENT DEPARTMENTS

DEPARTMENT	Any Organized Training		Training Agency		Training for Employees						Training for Non-Employees	
	Yes	No	Dept.	Other Agency	Classes		Correspondence Courses	Apprenticeship	Training on the Job		Yes	No
					Full Time	Part Time						
Agriculture		X										X
Civil Service Commission	X		X	X	X	X	X				X	
Citizenship & Immigration	X		X	X	X	X			X		X	
Defence Production	X		X	X	X							X
External Affairs	X			X	X	X	X		X			X
Finance	X			X	X	X	X					X
Fisheries		X										X
Insurance		X										X
Justice (Penitentiaries)	X		X		X	X					X	
Labour	X			X	X	X	X				X	
Mines & Technical Surveys	X		X		X	X	X	X	X		X	
National Defence (Armed Forces)	X		X	X	X	X	X	X	X		X	
National Health and Welfare	X		X	X	X	X	X		X		X	
National Revenue	X			X	X	X	X				X	
Northern Affairs & National Resources		X										X
Post Office	X		X	X		X	X		X			X
Public Printing and Stationery	X		X			X		X	X			X
Public Works	X		X		X				X			X

DEPARTMENT	Any Organized Training		Training Agency		Training for Employees					Training For Non-Employees	
	Yes	No	Dept.	Other Agency	Classes		Correspondence Courses	Apprenticeship	Training on the Job	Yes	No
					Full Time	Part Time					
Secretary of State	X					X	X				X
Trade & Commerce	X		X			X			X	X	
Transport	X				X			X	X	X	
Veterans Affairs	X		X	X	X	X	X		X		X

Training similar to that described in this report is also given in a large number of crown companies and agencies other than departments of government. It was felt, however, that such programs could be included, if deemed advisable, in a study of training in industrial establishments.

Arrangement of the Report

The final report, as submitted herewith, has been divided into three parts.

PART I deals with general practice and training procedures in all departments of government and briefly describes three methods of providing training, namely:

Educational Leave for individual trainees in degree-granting courses of universities;

External Training for individuals and groups of trainees in the form of short intensive courses provided by outside agencies; and

Correspondence Courses of various types.

PART II deals with the training responsibilities and activities of the Civil Service Commission and briefly describes some of the courses which are made available to employees of various government departments.

PART III consists of a series of separate sections or reports dealing with the nature and scope of training programs and courses operated by the selected departments and agencies.

PART I - GENERAL PRACTICES AND PROCEDURES

Introduction

The great variety of professional, technical, clerical and industrial occupations in which federal government employees are engaged; the multiplicity of departments, commissions, boards and other agencies which constitute government establishments; and the highly specialized nature of the services rendered by some departments and agencies, give rise to many special problems in the selection and training of personnel for each organization or establishment. There is no established system or pattern of training which applies to all government departments. There are, however, some common practices and procedures which apply to all departments and agencies of the federal government.

The general practice, for all except the most senior or highly specialized positions, is to fill vacancies and to make promotions through competitive examinations, taking into account such factors as seniority, efficiency, and ability to perform the duties of each vacant position. Where vacancies can be filled by qualified candidates from within an establishment or organization, promotions may be made on the recommendation of the head of such organization, provided an appeal period is established to ensure that no other qualified person has been overlooked.

Except for those senior positions which are filled by Cabinet Council appointment and those casual or maintenance jobs which are not classified as civil service positions, all appointments must be made or approved by the Civil Service Commission, in accordance with salary rates, duties and qualifications as set forth in staff establishments approved by the Civil Service Commission and Treasury Board.

In selecting candidates for promotion, preference is given to regular employees of each department or government agency. Such preference, however, is usually due to superior knowledge and skill acquired through experience and study rather than to any organized plan of training for advancement. Nevertheless, the highly specialized requirements of certain occupations which are peculiar to government employment, such as those in the postal and diplomatic services, make it essential to operate continuing training programs for both new and established employees. These highly specialized programs and some of the informal types of staff training peculiar to the needs of certain departments and agencies are not described in this report but they do, in total, constitute an important contribution to manpower training and upgrading within government service.

The prevailing practice respecting ordinary civilian occupations is to seek qualified persons for each vacancy as it occurs. Staff training programs for such occupations are organized only when the supply of suitably trained personnel is inadequate or when the general level of competence in any group is too low to meet established or desirable standards.

Generally speaking, it is the responsibility of each individual to prepare himself for initial appointment. Having entered government service he qualifies for advancement by gaining experience on the job and by taking advantage of opportunities for suitable instruction or training which may be provided by government, universities, schools, and industrial establishments.

Purpose and Scope of Training

Training programs and courses in federal government departments are designed to meet specialized manpower needs; to help overcome continuing shortages of trained personnel where these directly affect government operations; and to provide refresher or upgrading courses for government personnel.

Some of the programs consist of courses designed to improve the technical competence or scientific background of the trainees. Many courses provide specialized instruction on new equipment or processes and may be given by outside agencies. Some provide instruction and training in subjects and skills which are peculiar to government service. Relatively few are wholly technical or operational in nature. All courses, however, are given for the express purpose of improving government service and developing the proficiency and potential capacities of the trainees. In this sense, they may be regarded as vocational training.

Courses for new employees, other than indoctrination or orientation courses, are usually organized to counteract acute shortages of suitable applicants for existing vacancies. Such courses are operated by a government department or agency when a sufficient number of adequately trained recruits is not provided by schools and outside agencies or when such training can be given more economically or effectively within the service. These special courses are operated only until the immediate need or shortage has been met.

Occupational and technical courses for permanent or established employees are designed specifically to improve the proficiency of the trainees in their current positions, thereby improving the quality of the service rendered. Qualification for promotion is incidental.

Methods and Types of Training

Where feasible, each department or agency is expected to provide or arrange for all formal and on-the-job training required to maintain and develop its distinctive services. In some occupations and classifications it is more effective and less costly to provide centralized training courses for both new and regular employees, especially in those occupations involving large numbers of employees distributed among several departments. On the other hand, where few persons, in regular civilian occupations, require special training at any one time, it is usually advisable to purchase courses from outside agencies specially qualified to give such training.

As previously indicated, the wide scope of training requirements at various levels and the fluctuating needs for training within the various categories necessitate flexible and easily adjusted methods and programs of training. Any effort to centralize all training or to standardize all courses would probably result in a cumbersome system which would not serve the needs of any one department or agency.

The various methods which have been adopted to provide employee training in government service may be summarized as follows:

- (a) Leave of absence, with or without pay, while attending a regular university course for which academic credit is given or an approved course in an accredited school or teaching institution. This method is described in this section of the report under the heading "Educational Leave".
- (b) Leave to attend university degree-granting courses, on pay or allowance, prior to commencement of regular duties. This method may also be called "Educational Leave". It is used by the armed forces to recruit certain officers and has been used, on rare occasions, for government appointments to professional and advanced technical vacancies, when qualified candidates were not available.
- (c) Leave for regular employees while attending, on full pay and at government expense, approved conferences and short-term courses for which no academic credit is given. These may be given in a school or in any institution or organization outside government service which provides special training of the type required. This method is described and sample courses listed under the heading "External Training".
- (d) Attendance during working hours, on pay or fixed allowance, at short-term courses of a technical or operational nature which are conducted by or on behalf of the Civil Service Commission to meet temporary, acute recruitment difficulties or staff development problems in specific occupations or classifications. Some courses of this type are described under the heading "Technical and Operational Courses" which follows Table 4 in Part II of this report.
- (e) Attendance during working hours, on regular pay, at centralized courses conducted by the Civil Service Commission to meet continuing or long-term training needs in specific occupations or classifications. Courses of this type are described under the headings "Continuing Stenographic and Typing Courses" and "Correspondence Course in Office Management" at the end of Part II.

- (f) Attendance by selected groups of trainees, who are employed in administrative or in supervisory capacities in various departments and agencies, at centralized courses conducted periodically or annually by the Civil Service Commission for staff development and to improve the standards of government services. Such courses are listed in the first two categories of Table 4 in Part II of this report, under the headings "Government Administration" and "Supervisory".
- (g) Attendance by groups of trainees in any one department or agency at short programs or courses designed to meet specific training needs of employees in such department or agency. Selected courses of this type are described in various sections of Part III of this report. Most of the organized training given by government departments is provided through supervised training-on-the-job. In a few cases this method has been developed into a program of apprenticeship.
- (h) Another type of course, which is provided by the departments or agencies in which the trainees are employed, is known as an "Orientation Course". One or more courses of this type are usually given to new employees in departments and agencies which provide training programs of any type. These courses vary in length from one or two hours to several days, depending on the duties, responsibilities, and relationships of the trainee. Since they deal only with matters peculiar to government service in specific fields, they are not described in this report.

Administration and Control of Training - General

As has been stated, there is no standard pattern or procedure in the administration of training programs and procedures throughout the government service. Staff training within each department and agency is a responsibility of the deputy head. It is usually carried out through the personnel branch or office of the establishment.

Some departments which operate extensive training programs employ Staff Training Officers. Their main function is to promote, supervise and conduct special courses as required to meet current training needs.

Other departments operate effective training programs along the lines indicated in the preceding section without the services of specially appointed officials.

Those training programs which are conducted by or which require the approval of the Civil Service Commission are administered or controlled by the Commission through the Director of Planning and Development who is directly responsible to the Commissioners. The functions and duties of the Planning and Development Branch are performed by four divisions: Research and Testing, Advertising and Recruitment, Counselling, and Staff Development.

The Training and Staff Development Division is responsible for the organization and operation of all staff training courses conducted by the Commission. It also acts for the Director in approving or controlling other courses and training programs. The staff of this division, which is headed by the Chief of Division and an Assistant Chief, are trained educationists with teaching and industrial experience who have served in line positions in more than one department.

All leave of absence for courses taken under the program of "Educational Leave" must be approved by the Commission. All expenditures on courses provided under the program of "External Training", where the cost exceeds three hundred and fifty dollars or the course lasts for over two weeks, require the approval of Treasury Board, on recommendation of the Commission. Training outside Canada is approved only if suitable courses are not available in accredited Canadian institutions. The Commission checks on the qualifications of the trainee and the suitability and availability of such proposed training. It may recommend other courses of action which, in its opinion, will better meet the requirements of any case.

Treasury Board approval must also be obtained for any courses to be conducted by a department or agency of government when expenditure of public funds other than those already voted for such purpose are involved.

Selection of Trainees

Candidates for training in classes conducted by the various departments and agencies are selected by the senior officer of each branch or organization in co-operation with the personnel officers. Quotas are allotted to departments and agencies for classes operated by the Civil Service Commission. They are based on the number of employees. Trainees who are granted leave of absence for educational training and those who attend special courses conducted by outside agencies are nominated by their respective departments for endorsement by the Civil Service Commission and approval by Treasury Board, where necessary.

In organizing training programs for government employees or selecting trainees there is no distinction or discrimination on the basis of sex. Some classes such as those for stenographers and typists, are attended almost exclusively by women. Others, such as stationary engineering, include no women. Available statistical data provide no figures to indicate the proportion of female enrollees in any course or program.

Educational Leave

The term "Educational Leave" is used to designate a program of training under which an employee of any department or agency of the federal government may be granted leave of absence while attending a regular university course for which academic credit is given, or an approved course in an accredited school or training institution.

Applications are approved by the Civil Service Commission on the basis of the need for such training and its suitability for meeting the requirements of the department or agency. The urgency and degree of the need, as evidenced by the use to which it will be put, also determines whether the trainee will receive full, half, or no pay during the training period.

The deputy head of a department or the senior official responsible for the nomination of trainees is usually assisted by a screening committee. The Commission also makes use of an unofficial advisory committee in reviewing and approving individual cases.

The application form must provide full particulars regarding the qualification of the applicant, the suitability of the proposed training, a detailed description of the course content, costs involved, an explanation as to why the department considers the proposed course or program to be the best means of providing the needed training, and the manner in which the training will be made use of by the department.

"Educational Leave" is used by departments for special cases. Ten cases were approved during the quarter from January 1st to March 31st, 1959. A total of only 138 employees were granted leave during the fiscal year 1958-59.

An indication of the variety of courses attended by persons on Educational Leave is given by the examples shown in Table 2.

Table 2
Examples of Educational Leave

Name of course	Location	Given by	Duration	No. of Trainees
<u>Dept. of National Defence</u>				
Chemistry for Ph.D.	Seattle	Univ. of Washington	8 mos.	1
English for Ph.D.	Seattle	Univ. of Washington	8 mos.	1
Social Welfare	Edmonton	Univ. of Alberta	1 wk.	1
<u>Dept. of Veterans' Affairs</u>				
Adult Education	Winnipeg	Univ. of Manitoba	30 days (part time)	1
Teaching and Supervision- Nursing	Edmonton	Univ. of Alberta	9 mos.	1
Advanced Counselling	Montreal	McGill University	3 mos.	1
Rehabilitation & Counselling	London	Univ. of Western Ont.	20 days	5
Rehabilitation Counselling	Montreal	Univ. of Montreal	3 wks.	3
Advanced Rehabilitation Methods	New York	Univ. of New York	1 month	1

Table 2 (Cont'd)

Recreation Directors	London	Univ. of Western Ont.	5 days 2 yrs.T.O.J.	2
Hospital Organization & Management	Toronto	Univ. of Toronto	4 wks	7
Nursing Educ'n, Post Grad.	Ottawa	Ottawa University	8 mos.	1
Hospital Nursing, Post Grad.	Toronto	Univ. of Toronto	9 mos.	1
Surgical Nursing	New York	N.Y. City Hospital	6 mos.	1
Medical Librarian	Vancouver	Univ. of B.C.	7 wks	1

External Training

Another program or type of training which is available to employees of any department or agency of the federal government is known as "External Training".

Under this program, individual employees are sent, on full pay and at government expense, to special non-academic courses or conferences for training and information which is deemed necessary to develop or maintain an effective public service. Such courses and conferences may be conducted by private schools, by industrial and commercial establishments or by other suitable, accredited institutions and organizations outside government service.

Courses provided under this program are ordinarily of three types:

pre-service (or pre-employment) courses in unique departmental skills, where employees cannot be recruited with these skills;

courses or conferences developed by departments in collaboration with any agency outside the Civil Service to give training in new methods or specialized knowledge for selected groups of their employees; and

courses or conferences of an educational nature for selected individuals who have the potential for advancement.

Trainees are selected and applications are dealt with in the same manner as for "Educational Leave". Treasury Board approval is necessary in each case where the costs exceed three hundred and fifty dollars (\$350) or the course lasts more than two weeks. Each trainee is expected to submit a report on the course taken or conference attended.

This method of training is used more than "Educational Leave" and covers a wide variety of courses and conferences but the number of employees selected each year is relatively small. Sixteen trainees from four departments were approved during the quarter January 1st to March 31st, 1959. The courses varied in duration from 3 to 25 days. It is estimated that approximately 400 employees are approved for such training during each year.

The broad scope of the courses and conferences used by various departments and agencies to meet these special training needs is indicated by the following examples:

Table 3
Examples of External Training

Course	Location	Given by	Duration	No. of Trainees
<u>Dept. of National Defence</u>				
Aircraft Electrical Equip't	Montreal	Canadair Ltd.	18 days	1
Torpedo Testing	Florida	U.S. Navy	54 days	2
Guided Weapons	United Kingdom	Royal Navy	7 wks	1
Electronic Equipment	Baltimore	Bendix Radio	8 days	1
Storage Batteries	Atlantic City	U.S. Signal Eng'g Lab.	3 days	1
Ind'l. & Comm'l. Lighting	Toronto	Can. General Electric	3 days	1
Power Sources Conference	New Jersey	U.S. Army	3 days	1
Water & Sewage Operators	Winnipeg	Prov'l Dept. Health	3 days	6
Boiler Water Chemistry	Trenton	Bird Archer Co.	2 days	30
Accident Prevention Convention	Toronto	Ont. Association	2 days	1
Quality Control	Ottawa	R.C.A.F.	12 days	8
International Gearing Conference	London, Eng.		22 days	1
Land Locomotion	Ann Arbor	Univ. of Michigan	5 days	1

Table 3 (Cont'd)

Dept. of National Defence (Cont'd)

Muskeg Research Conference	Winnipeg	N.R.C.	1 day	1
Management Analysis	Washington, D.C.	U.S. Navy	31 days	1
Merit Rating	New York	American Management Assoc'n	3 days	1
Operations Research & Programming	Toronto	Stevenson & Kellogg	4 wks	1
Photogrammetry Convention	Washington, D.C.	American Society	4 days	1
Office Work Study Course	Montreal	Can. Industries Ltd.	5 days	1

Dept. of Veterans' Affairs

Rehabilitation of Disabled	Charlottetown	Conference	5 days	4
Social Welfare Admin.	Vancouver	Univ. of B.C.	18 days	1
Advanced Case Work	Winnipeg	Univ. of Manitoba	5 days	1
Hospital Administrators	Washington		3 wks	1
Medical Technology	Quebec City	Hospital	5 days	2
Obstetrics	New Westminister	Hospital	4 wks	1
Diseases, Post-Grad.	New York	Univ. of New York	5 days	1
Basic Radiological Health	Cincinnati	Clinic	10 days	1
Clinical Radio-isotope Techniques	Edmonton	Univ. of Alberta	15 days	1
Psychiatric Nursing	London, Ont.	Hospital	4 months	8
Government Administration	3 centres		6 days	13

Correspondence Courses

It is not general practice to purchase or to promote the use of correspondence courses as a means of staff training but many civil servants and other employees of government departments enroll in such courses on their own initiative and at their own expense.

In special cases, the fees of approved correspondence courses may be paid by the government as part of an on-the-job training program. For example, stationary engineers who successfully complete appropriate courses provided by the Calgary Institute of Technology and Art are reimbursed for one half of the fees.

The correspondence courses which are provided by the Department of Veterans Affairs are also used extensively by the armed forces, Canadian penitentiaries, and civil servants. Most of these courses are based on secondary school curricula and are used to acquire necessary academic qualifications. Some courses provide vocational instruction in various fields. Detailed information about such courses is given in Part III of this report, under the heading, Department of Veterans' Affairs. A correspondence course in Office Management, which is described in Part II, is organized and serviced by the Training and Staff Development Division of the Civil Service Commission.

PART II - TRAINING BY THE CIVIL SERVICE COMMISSION

Introduction

In this part of the report, an effort has been made to summarize the nature and extent of the courses provided by or through the Commission, and to describe those continuing courses which come within the scope of the survey. A few of the temporary courses that have been used to overcome acute shortages in the recruitment of skilled workers and technicians are also described.

Training Activities of the Commission

The training activities of the Commission are determined by three primary functions or responsibilities, namely:

- to encourage and promote the development of effective training programs and courses to meet specific training needs of government departments and agencies;

- to develop and maintain high standards and economically sound procedures of training to meet such needs; and

- to assist departments and agencies of the federal government in the organization and operation of such programs and courses.

These functions and the resulting activities are, in part, an outgrowth of the training program for supervisors that was inaugurated under the auspices of the Vocational Training Branch of the Department of Labour near the close of World War II. Courses designed to train supervisors in the techniques of instruction and job relations have developed into an extensive system of supervisory training, utilizing various types of short courses, attendance at special conferences, and the use of libraries, films and other teaching aids.

Many of the courses and programs developed during the past fifteen years are operated by government departments and agencies without assistance or supervision from the Commission. Some are operated jointly while others are conducted wholly by the Commission.

Relatively few of the formal courses operated by the Commission come within the terms of references of this survey. The majority are non-technical in nature, having to do with general problems of supervision or government administration. Most of the technical and operational courses are of short duration; some are highly specialized in content; and others enrol very few trainees.

Centralized Courses

Table 4 lists, by classification, those courses that were conducted by training officials of the Commission during the fiscal year 1958-59, except orientation courses and a few special courses given in departments that lacked facilities for meeting their own needs. All courses except the one for district officers were conducted in Ottawa, some being attended by officials from outside centres.

For standard courses, the table indicates the length of time during which each course was operated, the number of hours in instruction, the number of classes held during the fiscal year, the total enrolment in classes, and the number of years during which the course has been in operation, with average annual attendance. Enrolment in administration courses is fixed by departmental quotas which are filled without difficulty.

Table 4

Central Courses and Conferences Conducted by the Civil Service Commission

Name of Course	Period	Total No. of Hours	No. of Classes	Enrol 1958-59	Remarks
<u>Government Administration</u>					
Senior Administrators	4 wks.	200	1	36	annually for 5 yrs.
Intermediate "	2 wks.	100	1	36	" " 2 yrs.
Junior "	2 wks.	70	1	35	" " 5 yrs.
	(plus $\frac{1}{2}$ day weekly for 6 mos.)				
<u>Senior Personnel</u>					
Officers	4 days	30	1	35	held only once
Senior District Officers	1 wk.	60	1	154	annually for 2 yrs.
			(at 4 centres)		
<u>Supervisory</u>					
Supervisors, Steno. Pools	2 wks.	40	1	15	average enrolment: 24
	(11 half-days)				(for past 5 yrs.)
Supervisors, Central Registries	2 wks.	40	2	60	45
	(11 half-days)				(for past 3 yrs.)
Office Management by Correspondence	6 mos.	18 assignments	2	1977	1800 (for past 10 yrs.)
<u>Technical and Functional</u>					
Forms Design	8 days	48	1	25	held only once
<u>Commercial, Stenographic and Typing</u>					
	3-5 mos.	indef.	intake monthly	700	average enrolment: 600
<u>Officers from Foreign Governments (U.N., etc.)</u>					
	2 days to 1 wk.			26	(for past 5 yrs.)

NOTE: (1) The Commission is assisted by senior officials from various government departments and by experts from outside institutions in providing instruction for administration courses and in certain technical courses. (2) The organization and course content of the above programs have changed considerably since their inception so that cumulative figures of enrolments during a period of five years would be misleading, in most cases.

Technical and Operational Courses

The types of courses with which this survey is primarily concerned would, with few exceptions, be listed under "technical and functional". Since such courses are usually operated to meet recruitment shortages or other temporary situations and since only one course in this category is included in the foregoing table, it is deemed advisable to briefly describe several other courses of this nature which have been operated by the Commission within the past eight years.

Draughting: In 1951 the Commission organized and operated a six months pre-employment course in map draughting for newly recruited trainees who were assigned to vacancies in different departments prior to training. In subsequent classes the recruits were paid a fixed allowance while undergoing such training and were assigned to suitable vacancies, and became civil servants, on completion of the training period.

A six months pre-employment course in general draughting was inaugurated by the Commission in 1952 and the two draughting courses were operated concurrently in a temporary school or training centre in Ottawa.

These courses were discontinued in 1954 after a total of 140 trainees had been graduated. Necessary instruction in this field is now provided through on-the-job training for student draughtsmen, in the departments concerned.

Stationary Engineers: Recruitment difficulties and low standards of proficiency in some government heating and power plants resulted in the organization of a six months training program for young men recruited by the Commission for assignment to various departments immediately following graduation.

Courses were held in Ottawa and Winnipeg and were conducted by the provincial Departments of Education as part of the "Canadian Vocational Training" program under the provisions of the Vocational Training Coordination Act. Allowances to trainees were paid by Treasury Board and other training costs were refunded to the participating provinces by the federal Department of Labour.

Trainees were divided into two groups which alternated, on a weekly basis, between full-time classroom instruction and training-on-the-job in appropriate heating and power plants. The classroom instruction was based on the course for stationary engineers at the Calgary Institute of Technology and Art.

In addition to federal rating examinations on completion of training, the trainees sat for the regular provincial examinations. Most of the graduates qualified for fourth class provincial certificates. A few, with previous experience, obtained third class certificates.

Forty trainees were graduated in each of the years 1955 and 1956. They were placed as engineer-firemen.

These and other engineers in federal government plants are encouraged to qualify for upgrading by enrolling in the nationally adopted correspondence courses operated by the Calgary Institute. One half of the fees are refunded to trainees who complete appropriate courses.

Varitypers: During 1956 and 1957 the Commission organized six classes for the training of varitype operators in a six weeks full-time program operated at the Printing Bureau of the Department of Public Printing and Stationery. The instructor was supplied by the manufacturer of the equipment, at no charge. Forty operators were trained to meet the urgent needs of the Bureau and some other departments.

Teletype Operators: A centralized two weeks, full-time course for teletype operators was conducted by the Commission in 1957. An expert instructor was supplied by the company. He trained 12 employees of several departments.

Naval Architectural Draughtsmen: In 1955, the Commission arranged with the Vocational Training Branch of the Department of Labour (C.V.T.) to pay the instruction costs of a three-year training program in naval architectural draughting for civilian employees of the Department of National Defence who could not obtain necessary technical training in this field anywhere in Canada. The instructor is a member of the department's staff and the course is organized on a part-time basis - one hour per week in a classroom, on government time, and one or two hours per week on assignments or homework. Two junior draughtsmen have completed the course to date.

The foregoing descriptions, while incomplete, indicate the types of training required from time to time and the different methods which have been adopted to provide "technical and operational" courses.

Continuing Stenographic and Typing Courses

The only continuous courses which are conducted wholly by the Commission and which are designed to prepare trainees for initial employment in specific service-wide occupations, or to increase the skill and proficiency of government employees in such occupations, are the complete courses in stenography and the refresher courses in shorthand and in typing which are operated in a special school or training centre at Ottawa.

This special school provides the following courses:

A complete "concentrated stenographic course" of from four to five months duration operated on a half-time basis. Two classes of 30 trainees each attend daily sessions of about 3 hours, one class in the morning and the other in the afternoon.

The morning sessions are for students of Pitman shorthand and the afternoon sessions are for those studying the Gregg system. The subjects comprising the course are shorthand, typewriting, English, and secretarial duties.

This course has been established to help overcome the continuing shortage of qualified stenographers. It is intended for persons employed in government service as junior clerks and typists who wish to qualify for appointment as stenographers.

A "refresher course in Pitman shorthand" of approximately four months duration is provided for government employees with a knowledge of shorthand theory, who can take dictation at not less than 50 words per minute, and who require additional training to fully qualify in their present positions. Classes are held during weekly periods of $1\frac{1}{2}$ hours.

A "refresher course in Gregg simplified shorthand" is conducted for government employees with a knowledge of the basic theory of Gregg shorthand and a dictation speed of 50 words per minute or faster, who require additional training. Classes are held for $1\frac{1}{2}$ hours per week during approximately four months.

A "refresher course in typewriting" is available to employees with a basic knowledge of the keyboard who can type from 10 to 20 words per minute. Classes are held weekly as for refresher courses in shorthand.

Recommendations for training in these four courses are submitted to the Commission through deputy heads of departments. Responsible officials must certify that the service, attendance, and attitude of each applicant have been satisfactory. Enrollees are carefully screened by tests and observation before final acceptance by the school.

A total of 700 employees were enrolled during the fiscal year 1958-59. The average intake for the past five years has been approximately 600 trainees.

Correspondence Course in Office Management

Another continuous course operated by the Commission, and one which has undoubtedly raised the standard of proficiency in government service, is the correspondence course in office management.

This course consists of eighteen lessons, each with assignments. It is usually completed in from six to eight months and is administered by an official of the Training and Staff Development Division of the Planning and Development Branch of the Commission.

Mid-term tests are held on completion of Assignment IX and final examinations are usually held annually, about the middle of May.

Candidates are selected by their respective departments or agencies from employees engaged in a supervisory capacity, who aspire to supervisory positions.

Lesson topics include - functions and principles of management; planning; forecasting; organization of offices; line of authority; instruction of subordinates; co-ordination and control; responsibilities of supervisors; job analysis and instruction; working conditions; office equipment and layout; office services; short cuts; letter and report writing; committee work; staff rating; leadership; and personnel problems regarding selection, maintenance of interest, and advancement.

PART III - TRAINING IN GOVERNMENT DEPARTMENTS

DEPARTMENT OF VETERANS AFFAIRS (DVA)

Organization and Control of Training Activities

Employee training within the Department of Veterans Affairs is a responsibility of the Director of Personnel and Administrative Services. The direction and control of departmental courses is exercised through the Staff Training Division headed by the Supervisor of Staff Training who is assisted by seven full-time Area Staff Training Officers and eleven part-time District Staff Training Officers. The Area Officers supervise and conduct training in from one to four districts and are stationed at the larger district offices across Canada. The part-time District Officers are stationed in each of the districts where an Area Officer is not located. They act as assistants to the Area Officers and make all local arrangements for classes, which are usually taught by Area Officers or specialists from within (or without) the Department.

No departmental course is conducted without the approval of the Supervisor of Staff Training and most departmental courses are prepared at headquarters.

In each district there is a representative Staff Training Advisory Committee which is appointed locally and consists of a senior official from each of the departmental services or branches, including personnel, welfare, pensions, hospitals, and other institutions.

Functions of Training Committee and Section

The principal functions of the advisory committee are to identify training needs, to collaborate in meeting current needs, to forecast future needs, to co-ordinate local administration of courses provided by head office, to evaluate training results, and to assist the Staff Training Officer in his training, rating, and welfare activities.

The functions of the Staff Training Section are not confined to training activities. They include such activities as:

carrying out induction and orientation training for all new employees;

counselling employees on their personal problems;

Ensuring that each new employee acquires the requisite knowledge and skills for his position;

improving departmental efficiency by aiding employees to increase their usefulness through training;

assisting in devising ways and means of improving the efficiency of employees whose performance is substandard;

counselling and assisting employees who request or need coaching for civil service examinations;

assisting in the training of employees engaged in work of a specialized nature;

assisting in training supervisory and administrative personnel;

assisting in raising and maintaining staff morale by fostering an adequate employee welfare program;

retraining employees in acquired knowledge and skills, for the better utilization of existing personnel;

organizing, developing and administering a standard program of employee efficiency rating;

conducting job analyses and surveys when required;

organizing and developing an accident prevention program; and

co-operating with the District Fire Prevention Officer, by assisting in organizing and conducting a fire prevention program.

The fulfilment of these functions involves many duties and activities which do not come within the scope of this survey.

Department Training Courses

Courses operated by or through the Staff Training Section do not include training under the programs of "Educational Leave" and "External Training", nor those in-service training courses provided by the Civil Service Commission. In some cases, employees who take correspondence courses conducted by outside agencies receive assistance and tutoring from Staff Training Officers.

Courses for nursing assistants are operated by the Nursing Services. Correspondence courses are conducted by the Welfare Division. Each of these programs is described under separate headings in this section of the report.

Statistical Data

During the calendar year 1958 the Staff Training Section conducted 1195 classes in 25 different courses, excluding film showings and miscellaneous activities. The total enrolment was 8,924 and very few trainees were enrolled in two or more courses.

Table 5 indicates the variety, duration and total annual enrolments in departmental courses. Table 6 shows the distribution of enrolments by districts.

It will be noted that no classes were conducted during 1958 in eleven of the approved courses. This indicates the fluctuation in demand or need for courses from year to year, due to variations in the work load and staff.

Comparable figures are not available for previous years, but it is understood that the over-all number of trainees is fairly constant.

Table 5
DVA Staff Training Department Courses, 1958

<u>Name of Course</u>	<u>Duration</u>	<u>Enrolment 1958</u>
<u>Basic Training</u>		
Induction	1 hr.	244
Orientation	5 hrs. av.	1037
Superannuation	5 hrs. av.	177
Human Relations	2 hrs. av.	59
<u>Supervisory Training</u>		
Technique of Instruction	10 hrs.	-
Human Relations	5 hrs. av.	-
Employer-Employee Relations	10 hrs.	1
How to Prevent Grievances	2 hrs.	-
How to Handle Grievances	2 hrs.	-
How to Correct Workers	2 hrs.	-
Work Simplification	10 hrs.	70
Efficiency Rating & Appraisal	5 hrs. av.	450
Interviewing	2 hrs. av.	-
Counselling Techniques	indefinite	-
Letter and Report Writing	10 hrs. av.	23
Pool Supervisors	indefinite	48
Departmental Procedures	indefinite	321
<u>Skill Training</u>		
Stenographic and Typing	indefinite	56
Secretarial Practice	indefinite	-
Telephone Technique	1 hr.	779
Filing	3 hrs. av.	-
Commercial (coaching)	indefinite	3
Investigators	5 hrs.	639
Safe Food Handling	5 hrs.	253
Cleaning Service	8 hrs.	151
Hospital Nursing Orderlies	indefinite	956

Skill Training cont'd

Fire Prevention	indefinite	2092
Accident Prevention and Safety	indefinite	683
Office Economy	3 hrs.	147
Professional	indefinite	314

Administrative Training

Junior Administrative Officers (outside districts)	indefinite	3
Dictation Methods		-
Personnel Officers		4
Office Management (coaching)	indefinite	105
Staff Development		309
	Totals	<u>8924</u>

Visual Aids

Film Showings	single sessions	3732
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Miscellaneous

Study Group Meetings
Tutorial Training
Personal Interviews
Staff Training Libraries
Promotion Competitions

Note - There are no fixed dates or frequency periods for classes in the various courses. Both the duration and the frequency of classes vary for each course and within each district. The number of hours indicated for each course in the above table is the approximate average for all districts. An effort is made to hold classes at hours convenient for the officers and trainees concerned. Courses of more than two hours duration are usually divided into daily sessions of approximately one hour each. These may be held during working hours or at the close of the working day, with half of each session being held on the trainees' time.

Table 6

Enrolments By Districts in Department Courses - 1958

Course	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Totals
<u>Basic Training</u>																		
Induction	-	-	-	-	-	1	7	172	-	58	-	-	-	-	6	-	-	244
Orientation	328	119	-	5	-	107	-	113	59	62	15	-	62	65	-	-	102	1037
Superannuation	-	-	-	63	19	7	-	88	-	-	-	-	-	-	-	-	-	177
Human Relations	2	-	-	-	-	-	-	-	-	57	-	-	-	-	-	-	-	59
<u>Supervisory Training</u>																		
Employer-Employee Relations	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Work Simplification	-	26	12	-	-	-	3	-	7	-	-	-	22	-	-	-	-	70
Efficiency Rating	64	65	30	14	-	114	-	8	50	-	-	-	62	22	6	15	-	450
Writing-letters, Reports, etc.	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
Pool Supervisors	32	9	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	48
Departmental Procedures	-	-	-	-	-	272	21	-	-	-	-	-	28	-	-	-	-	321
<u>Skill Training</u>																		
Stenographic & Typing	-	-	-	-	-	34	-	-	-	-	-	-	22	-	-	-	-	56
Telephone Technique	-	60	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	779
Commercial (coaching)	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3

Skill Training (cont'd)

Investigators	-	-	14	20	8	137	76	-	-	-	-	77	12	238	47	10	-	-	639
Food Handling	10	-	-	-	19	-	-	-	-	-	-	224	-	-	-	-	-	-	253
Cleaning- Service Men	-	-	-	-	-	-	-	15	-	91	-	-	-	-	45	-	-	-	151
Nursing Orderlies	18	-	-	-	-	5	-	796	-	115	-	22	-	-	-	-	-	-	956
Fire Prevention	-	-	-	-	-	594	-	308	-	-	-	702	-	395	93	-	-	-	2092
Accident Prevention	98	-	-	-	19	-	-	501	-	-	-	-	-	65	-	-	-	-	683
Office Economy	-	-	-	43	-	-	-	-	-	-	-	-	-	10	10	-	15	69	147
Professional	15	-	-	-	-	160	-	15	-	-	-	-	-	124	-	-	-	-	314
<u>Administrative Training</u>																			
Junior Adm. Officers	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	3
Personnel Officers	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	4
Office-Management Coaching	13	2	5	2	2	10	1	7	1	13	22	3	5	-	-	-	3	16	105
Staff Development	-	12	-	-	-	297	-	-	-	-	-	-	-	-	-	-	-	-	309
Totals	581	293	84	147	67	1748	108	2023	117	396	1748	15	1062	293	22	33	187	-	8924
Film Showings	1711	-	-	-	100	124	723	-	-	700	-	344	30	-	-	-	-	-	3732
Miscellaneous	42	-	32	10	-	149	4	67	53	152	65	1	180	34	-	-	-	44	833

Sample Courses

The following brief outlines of three selected courses indicate the extent of the instruction provided and the procedures followed in conducting such courses.

Office Economy Course: This is a single session course of $2\frac{1}{2}$ hours for secretaries, stenographers and clerical staff. It is designed to promote thrift in the various offices and services. It emphasizes means of reducing costs of telegrams and cables, and indicates how to effect economies in the use of paper, envelopes and other items of stationery as well as office equipment and supplies.

Cleaning Service Course for Men: It is the practice of the Department of Veterans Affairs to employ men for cleaning services in the hospitals and institutions operated by the Department. A training course of approximately eight one-hour sessions is conducted for cleaners and helpers as required to meet the need of each district. Instruction usually is provided on government time.

Following is an outline of the topics and time-table allotments of the first session of such a course conducted by the Area Staff Training Officer assisted by the District Fire Prevention Officer and the Supervisor of Cleaning Services in one of the largest DVA hospitals.

Session 1

Purpose of the course - 5 min.

Relationship between cleaner's work and fire prevention - 10 min.

Lecture on good housekeeping - 15 min.

Film - "Accidents Don't Happen" - 30 min.

Hand out quiz for next session.

The remaining seven sessions include lectures, demonstrations, films and discussion on such subjects as sweeping and dusting, scrubbing, cleaning materials, polishing, refuse disposal, and records.

An outline is furnished to each training officer and lecturer along with a quiz or list of questions for discussion at each session and a series of notes on the topics for each session.

Efficiency Rating and Appraisal: A course consisting of five one-hour sessions in the principles and practice of employee rating is provided for persons in supervisory positions.

The nature and content of each session are indicated by the following outline:

Session 1

General principles of rating - what is rating? why rate? who will be rated? who rates? when to rate? how to rate? job analysis; standards; the interview with rated employee; how rating will help; importance of rating.

Session 2

Efficiency rating form; identification items; factor rating scale; supplementary report; remarks; certificate; recommendations; verification and approval; weighing of factors.

Session 3

The rating process - steps in rating - analyzing the job, setting up standards, rating the employee; completing the form; the reviewing officer; interviewing the rated employee; the rater.

Session 4

Practice rating. Sample cases are submitted to the class for practice rating. These provide detailed information on which each case is rated independently by each trainee.

All reference material is supplied to the training officer along with copious notes on the introduction, the topics or content of each session, and the instruction technique to be followed. Classes consist of eight or ten supervisors of similar grade and experience.

Nursing Assistants

The Nursing Services of the Department of Veterans Affairs have conducted training programs for nursing assistants since 1952. The courses are very similar to those provided for "nurses' aides" under Canadian Vocational Training in New Brunswick and several of the western provinces.

A total of 38 classes have been held in specially organized courses or schools operating in DVA hospitals at Halifax, Montreal and Toronto.

Training is provided through a combination of classroom instruction and training-on-the-job, extending over a period of ten months. Trainees receive a fixed allowance of \$70.00 per month in lieu of living expenses. Graduates qualify as "Registered Nursing Assistants". About one quarter of the enrollees fail to complete training. Approximately half of the 516 trainees who have been graduated to date were given employment in DVA hospitals throughout Canada.

In the early stages, the costs of training were borne by the Department of National Health and Welfare under provisions for civil defence and graduates were free to seek employment wherever available. Recently the costs were transferred to the Department of Veterans Affairs and trainees must now undertake to serve for at least one year in a DVA hospital, if needed.

Courses have been discontinued in Toronto and Montreal but the continuing need for trained assistants and the waiting list of applicants in the Maritimes have made it advisable to continue operations in Nova Scotia, where classes are conducted in close co-operation with provincial authorities.

Department Correspondence Courses

Historical Background: During World War II the Canadian Legion of the British Empire Service League organized and operated an extensive system of academic and vocational correspondence courses which were made available, without cost, to personnel serving in the three armed forces. At the close of the war these courses, which operated under a chartered organization known as the Canadian Legion Educational Services (C.L.E.S.), were continued in Canada and overseas along with a library service and other Legion activities.

Enrolments in hospitals operated by the Department of Veterans' Affairs, together with new and renewal enrolments of veterans served by district offices, soon exceeded those in the active forces. On April 1st, 1947 the courses were taken over by the Rehabilitation Branch of the Department with the idea of continuing this service to veterans and members of the armed forces until the supply of textbooks was exhausted.

Need for Such Courses: The continuing demands for these courses in the permanent forces as well as in district offices and hospitals operated by the Department have made it advisable to maintain the service in these two fields. There is also an ever widening demand for these courses to serve veteran and non-veteran members of the Royal Canadian Mounted Police, the civil service, inmates of federal penitentiaries and reform institutions, and persons undergoing prolonged treatment in tubercular sanatoria and other institutions. On several occasions, the Department has obtained authority from Treasury Board to extend this service to non-veterans where it was deemed to be in the public interest.

The fact that the academic courses are the only courses which qualify graduates for university entrance in all provinces, and the importance of providing members of the armed forces with instruction for which credit is given in all parts of Canada, have made it advisable to continue this service even though some courses are becoming obsolete.

Costs: The courses are operated by the Welfare Branch of the Department as a special service. Instructors or examiners are hired by the Department on a contract basis and paid fees varying from 40¢ to \$1.25 per paper marked. The Department of National Defence provides an annual vote to

cover costs of re-printing textbooks. This is provided in lieu of fees for non-veteran members of the armed forces.

There are no charges or fees for veterans but nominal fees to cover costs of marking papers are paid by, or on behalf of, non-veterans. These fees vary from \$6.60 to \$22.00 per course. A flat fee of \$4.00 per enrolment is paid by the appropriate government departments on behalf of inmates of penitentiaries and reform institutions, also Indians and Eskimos. Non-veteran civil servants pay their own fees.

Scope of Courses: The academic courses cover essential subjects to qualify for university entrance up to senior matriculation level. Most of the vocational courses are similar to classroom instruction provided in vocational schools for students in commercial, industrial, and agricultural courses. Special courses in practical English, mathematics, science, navigation, forestry, commercial fishing and mining are also provided.

Vocational Courses: Following is a complete list of vocational and special courses, showing registrations and certificates of completion issued during the fiscal year 1958-59.

Table 7

Registrations and Certificates Issued, Vocational Courses, 1958-59

Vocational Course	Registration	Certificates Issued	Length of Course
Commercial -	777	89	
Business Arithmetic	164	21	20 papers
Bookkeeping "A"	477	54	20 "
Bookkeeping "B"	50	12	20 "
Shorthand "A"	82	2	20 "
Shorthand "B"	4	-	20 "
Technical (Industrial)	999	98	
Mechanical Drawing	141	16	20 papers
Automotive Engineering	179	15	20 "
Diesel Engineering	116	6	20 "
Practical Electricity	147	14	20 "
Principles of Radio	345	42	20 "
Sheet Metal Work	34	1	20 "
Moteurs Automobile	1	1	20 "
Le Moteur Diesel	9	-	20 "
Electricite Pratique	11	1	20 "
Dessin Industriel	16	2	

Agriculture -	156	16	
Business of Farming	26	2	20 papers
Soils & Field Crops	16	2	20 "
Poultry Raising	43	6	20 "
Horticulture	34	3	20 "
Livestock and Dairy Farming	37	3	20 "
Agriculture (Francais)	11	-	
Sols et Recoltes de Grande Cultures	3		20 papers
Aviculture	2		20 "
Production Animale	2		20 "
Horticulture	4		10 "
Small Holdings -	226	57	
Planning & Beautifying Home Grounds	3	1	5 papers
The Home Vegetable Garden	3	1	5 "
Plant Propagation	73	20	5 "
Market Gardening	22	10	5 "
Tree Fruits and Nuts	12	3	5 "
Small Fruits Culture	22	9	5 "
Seed and Bulb Growing	19	1	5 "
Poultry & Egg Production	18	1	5 "
Farm Animals	20	2	5 "
Bee Keeping	34	5	5 "
Special Courses -	342	48	
Pre-Aircrew English	2		15 papers
Pre-Aircrew Mathematics	1		15 "
Pre-Aircrew Science	1		15 "
Practical Trigonometry	2	3	10 "
Practical English for Army	9	1	30 "
Practical Maths. for Army	12	2	20 "
Practical Science for Army	3	-	20 "
Naval Educational Test 1 Arithmetic	-	1	12 "
Naval Educational Test 2 Mathematics	1	-	30 "

Higher Naval Educational Test	-	-	15 papers
Pilotage and Navigation	11	-	15 "
Elementary Navigation	21	5	20 "
Marine Engineering, 3rd Class	7	1	10 "
Marine Engineering, 4th Class	16	2	10 "
Elementary Marine Engineering, 2nd Class	4	1	20 "
Electrical Shop Mathematics	19	6	10 "
Machine Shop Mathematics	9	3	10 "
Forestry, Course I	112	12	14 "
Forestry, Course II	12	2	15 "
Foretrie (not a course)	1	-	14 chapters
Fishing (not a course)	3	-	12 "
Mining	96	9	21 papers
	<u>2511</u>		
Total	<u>2,511</u>	<u>308</u>	

Academic Courses: The academic courses are based on instruction provided in the day classes of municipal secondary schools and academic correspondence courses operated by the various provinces. Registrations and completion certificates issued in each subject at various levels during the fiscal year 1958-59 are shown in Table 8.

It will be noted that the number of certificates issued (1,452) is approximately 25 per cent of the number of registrations (5,550). It would appear that, on the average, more than one quarter of those who are registered in the various subjects each year continue to completion.

Types of Students: Table 9 indicates not only the continuing steady growth in certificates issued but also shows the distributions of courses among the various types of students who benefit by these academic and vocational courses.

Table 8.

Registrations and Certificates Issued - Academic Achievement by Grades - 1958-59

Academic Courses		Elementary		Grade A		B		C		Senior Matriculation		TOTALS	
Total Papers	Name of Course	Reg.	Cert.	Reg.	Cert.	Reg.	Cert.	Reg.	Cert.	Reg.	Cert.	Registrations	Certificates
102	English	388	73	271	24	98	13	126	35	83	51	966	196
20	Conversation Anglaise	326	20									326	20
20	Elem. Reading, Writing & Spelling	32	5									32	5
80	French	193	23	61	10	33	17	46	16	52	6	385	72
20	Francais Elementaire	2	36									74	2
80	Latin		-		2	10	2	4	1	2	1	16	6
20	German		-							28	1	28	1
80	Mathematics	964	128	1,240	153	496	142	291	76	224	102	2,215	606
15	Elem. Arithmetic	191	118									191	113
15	Math. Elementaire	86	27									86	27
15	Arithmetique	96	72									96	72
80	Science (Fr. and Eng.)	89	16	103	16	52	23	21	5			265	60
40	Physics		-					83	29	77	28	160	57
42	Chemistry		-					80	22	36	17	116	39
40	Biology		-					34	10	23	13	57	23
80	Social Studies (Fr. and Eng.)	77	21	82	21	55	18	104	36			318	98
20	History		-							69	24	69	24
40	Music A + B		-					(A)126	15	(B) 24	11	150	26
Academic Totals		2,480	507	1,793	231	744	215	915	245	618	254	5,550	1,452

Table 9.
Certificates Issued During Four-Year Period, By Type of Students

Student Course	1955-56		1956-57		1957-58		1958-59	
	Non-vets.	Total	Vets.	Non-vets.	Total	Vets.	Non-vets.	Total
Individual Veterans	-	234	268	-	268	278	-	278
DVA Hospitals	-	59	58	-	58	54	-	54
Civil Service	42	140	162	50	212	134	57	190
Reform Institutions	2	2		4	4		3	3
Penitentiaries	242	339	61	190	251	57	266	328
RCMP			1	1	2	2	2	6
Navy	4	9	1	16	17	4	8	15
Army	109	197	91	189	280	74	219	390
Air Force	208	273	90	297	387	75	452	514
TB Association	9	9		9	9		8	8
Arthritic Association				1	1			
TOTALS	616	1,262	732	757	1,489	678	1,015	1,760

NOTE: The courses have recently been used by the Indian Affairs Branch of the Department of Citizenship and Immigration and by the Department of Northern Affairs and National Resources, for the training of Indians and Eskimos.

DEPARTMENT OF TRANSPORT

Introduction

Staff training programs in the Department of Transport are conducted or arranged for by the Training and Welfare Division of the Administration and Personnel Branch.

The functions of this Division include:

planning, developing, co-ordinating and presenting training programs within the Department;

assisting department branches in arranging special training conferences and formal training programs;

arranging participation by the Department in government-sponsored administrative courses;

arranging participation in courses conducted by outside agencies;

other related activities with respect to orientation of new employees, development of efficiency rating, suggestion award plan, counselling interviews, recreation, safety, hospital and surgical insurance, and Colombo Plan training.

Nature and Scope of Training Programs

The nature and scope of the various training programs and courses in the Department are indicated by the following brief statements or summaries grouped under four headings. The first group, "A", consists of courses that are conducted by the Department on an annual or periodic basis to meet continuing needs. The second group, "B", includes samples of special courses organized and conducted by department officials to meet emergency or non-continuing requirements. Group "C" indicates the extent to which the Department makes use of courses conducted by the Civil Service Commission. The last group, "D", indicates the wide variety of courses and training programs conducted by schools, training establishments and industrial organizations. These are used for pre-employment training, where adequate numbers of qualified recruits are not available to meet immediate needs, and for post-engagement training of regular employees who require such training to keep abreast of new techniques and procedures. The nature and extent of these courses varies considerably from year to year.

Continuing Programs Conducted by the Department

Staff training officers of the Department conduct courses in supervisory and management practices, including interviewing and counselling techniques, efficiency rating, handling grievances, human relations, and promotional competition procedures. These courses are attended by groups of eight to ten supervisory personnel from field units or offices across Canada. This is a continuing program for all supervisors.

Similar courses are conducted in Ottawa for headquarters personnel and for officers from various locations across Canada who are brought in for technical and administrative training.

Orientation lectures are given to newly recruited staff of the Department in Ottawa, usually within a few weeks of their appointment.

Conferences are held in Ottawa each year for groups of technical personnel and supervisors from field units. These conferences, of approximately two weeks duration, deal with technical and administrative problems and supervisory practices.

Non-Recurring Courses Conducted by the Department

A special one-week orientation course was conducted for six newly appointed liaison officers in the Air Traffic Control Division. They also participated in a seminar on "attendance at conferences" and another on the "principles of the business interview."

A special program which lasted three months was conducted in 1957-58 for newly appointed regional personnel officers. It consisted of supervised training-on-the-job, supplemented by a series of twenty lecture-discussion meetings. These lectures were attended by all officers of the Administration and Personnel Branch.

During the same year, 36 members of the Telecommunications Branch were given a special short course in the operation and procedures of "promotional rating boards."

A selected team of instructors from the same branch were given a brief course in the technique of conference leading.

Courses Conducted by Other Governmental Agencies

Officers of the Department, at junior, intermediate and senior levels, attend the four administrative courses conducted annually by the Civil Service Commission.

About 15 employees of the Department each year attend the continuous refresher stenographic and typing courses conducted by the Civil Service Commission.

Approximately 285 employees enrol each year in the office management correspondence course conducted by the Commission.

One senior officer usually attends the National Defence Staff College at Kingston.

Courses Conducted by Outside Agencies

Approximately 250 radio operators are required each year to meet departmental needs. When sufficient trained personnel cannot be recruited, selected recruits are given pre-employment training at government expense, to qualify for second class certificates. This program is described briefly under the heading "Subsidized Training".

A correspondence course in aeronautical electronic equipment has been developed by the Department in co-operation with the Radio College of Canada to provide necessary technical training for telecommunication staff. Over 500 technicians and radio operators are enrolled in this course at any one time. About one quarter of these, selected on a competitive basis, have the cost paid by the Department.

The introduction of radar control of aircraft has necessitated special training in the use and maintenance of different types of radar equipment. This instruction is provided by experts from the manufacturing companies. Courses of approximately eight weeks duration are attended by about 100 technicians and operators. These courses will be incorporated in a new Department school to be established in Ottawa.

Inability to recruit a sufficient number of licensed aircraft mechanics has made it necessary to recruit learners and to provide special training through correspondence courses and training-on-the-job. Seven such persons have been trained during the past three years.

It has also been found necessary to provide training in helicopter servicing to selected aircraft mechanics. Twelve mechanics have received such training, at government expense, during the past three years.

Technical training was provided in 1957-58 for five technicians on the maintenance of a new type of ground control approach equipment at Gander.

Officers of the Meteorological Branch attended a five-week course in ice observing techniques given by the U.S. Naval Air Station at Lakehurst.

Two meteorologists attended a seminar at McGill University on Arctic meteorology.

Two instrument makers attended a special evening school training program on the application of electronic principles to meteorological measuring instruments. This course, given by the Radio College of Canada, involved attendance for two evenings per week during 14 weeks.

Selected airport employees participated in a coast-to-coast training program on the handling of crashed jet aircraft. This course, which lasted two days, was sponsored by the RCAF.

The Department provides scholarships or educational leave to a limited number of officers from government ships, while attending six months courses, in approved schools, to upgrade their certification as deck or engineering officers. Trainees are selected by a committee. Successful candidates are granted leave of absence with pay, and fees and transportation expenses are paid by the Department. Ten such awards were approved in 1955 but few have been issued recently.

Sixteen trainees have been recruited in an eight-year apprenticeship program for the training of marine engineers which started in 1956. Detailed information regarding this program is given in the following section, titled "Apprenticeship - Marine Engineering".

Eight officers of the Meteorological and Administration Branches attended various short courses in electronic data processing and programming during 1957-58.

Ten airways servicemen from across Canada received training from manufacturers' representatives and departmental staff on the maintenance of snow removal equipment.

Each year, from 10 to 13 officers of the Department attend the management training courses presented by the American Management Association and one officer attends the annual conference of the National Office Management Association.

In 1957-58, a special program was arranged for a senior transportation officer of the Indonesian Department of Transport who visited various units of the Department to familiarize himself with the duties and operations of his Canadian counterpart. Similar programs are arranged each year for from three to five officials from other countries.

Apprenticeship - Marine Engineering

Continuing difficulty in recruiting steamship inspectors and qualified personnel for other senior positions in the Marine Services of the Department led to the establishment, about three years ago, of a joint apprenticeship plan which it is hoped will alleviate the problem.

The plan provides for a carefully organized and supervised training program covering an eight-year period. Trainees with at least junior matriculation standing are selected through competitive examination by the Civil Service Commission. They are trained for five years as apprentices in various shipyards across Canada, and then spend three years at sea as junior

engineers in order to qualify for certification as first class marine engineers. They are then eligible to compete for officer positions on Department ships and for ship inspection positions.

A starting rate of from 80¢ to \$1.00 per hour, with semi-annual increases, is paid by the shipyards. To ensure all-round training, apprentices are moved from shop to shop in accordance with the following schedule of service periods: Engine fitting, 18 mos.; machine shop, 6 mos.; welding, 3 mos.; pipe work, 3 mos.; boiler shop, 6 mos.; electrical training, 6 mos.; hull work, 6 mos.; drawing office, 6 mos.; and school or special courses, 6 mos.

Trainees are required to attend evening classes on two evenings of each week in prescribed or approved courses of an advanced technical character. All apprentices are brought to Toronto annually, at government expense, for a special one-month course in a school operated by the Dominion Marine Association. This enables the Department to keep a close check on the training and progress of each apprentice.

The first wave of trainees under this plan consisted of eleven apprentices who were assigned to seven shipyards across Canada. After about three years, four have discontinued for various reasons. The second wave of five French-speaking trainees are in their first year at shipyards in the province of Quebec.

On completion of the shipyard training the graduates sit for examination to qualify for certification as fourth class marine engineers. After eighteen months of sea time they may sit for second class certificates or, in some cases, for third class certificates after one year at sea. On completion of a further period of eighteen months as second class engineers they may sit for the first class examination. When certified as first class marine engineers they become eligible to compete for officer positions in the Marine Services of the Department.

While serving at sea, trainees are encouraged to make use of all available training facilities, including attendance during off-duty periods at private schools and publicly operated classes in various ocean and lake ports.

It is hoped that some graduates with senior matriculation standing and the required number of years of acceptable experience may take advantage of available opportunities for advanced technical education leading to examinations for provincial certification and registration as professional engineers.

Subsidized Training - Radio Operators

When the Department is unable to attract sufficient licensed operators, it becomes necessary to secure approval for a subsidized training scheme. Potential radio operators, selected by the Civil Service Commission in open competition, are sent to designated approved schools for a ten-month course which qualifies graduates to sit for the second class certificate. Fees are paid by the Department and the selected trainees receive a living allowance while at the schools. On successful completion of the certifying examination they are taken on strength of the Department and assigned to suitable vacancies.

The numbers and distribution of such trainees since 1950 are shown below.

Table 10.

Subsidized Trainees, 1951-56

<u>Place of Training</u>	<u>Number of Subsidized Trainees</u>		
	<u>1951</u>	<u>1953</u>	<u>1956</u>
Vancouver	22	5	28
Calgary	9	7	12
Toronto	57	14	112
Montreal	-	-	40
Saint John, N.B.	33	8	29
St. John's, Nfld.	-	-	25
	<hr/>	<hr/>	<hr/>
TOTALS	121	134	246

Special Courses - Radio Operators

In addition to the foregoing subsidized scheme for some recruits, the Department is obliged to provide special post-employment courses for licensed operators on the staff, to qualify them for special duties and assignments included with their regular duties as operators of radio equipment in the different divisions or services of the Department. Such extra duties include special procedures, weather observing, ionosphere services, monitoring services, and teletype operation.

Licensing of Operators: The Department of Transport is not the only employer of radio operators in Canada but it is responsible for the examination and licensing of all such operators while employed in Canada or on ships of Canadian registry.

The Department issues a bulletin or circular titled "Syllabus of Examination" for first and second class certificates. It sets forth the conditions and requirements for certification, under the following headings:- persons eligible to attend examination; standards of knowledge required; suggested textbooks and diagrams; procedures of application for examination and re-examination; and the skill and knowledge requirements for first and second class certificates of proficiency. It also lists ten approved radio training schools in Canada as well as the 27 departmental offices across Canada at which examinations are conducted.

This bulletin serves as the basis for the curricula in approved schools.

Air Traffic Control

The Civil Aviation Branch of the Department of Transport operates "an Air Traffic Control Service for the purpose of ensuring the safe and expeditious movement of air traffic under all types of weather conditions and under congested conditions resulting from the constantly increasing volume of higher performance aircraft operations". This service is provided through a nation-wide system of centres and towers manned by various classifications and types of personnel, including chief controllers, area controllers, shift supervisors, flight data controllers, approach controllers, ground controllers, etc.

Aircraft movements are regulated under two sets of rules requiring specially trained staff. The first set, known as Visual Flight Rules (VFR), specifies the minimum visibility and other visual conditions governing an aircraft in flight. The second set, Instrument Flight Rules (IFR), sets forth the conditions governing instrument flight. Controllers operating under VFR issue instructions based upon visual observations of the aircraft. Those operating under IFR issue instructions based on recorded data and a mental picture of the constantly changing position of the aircraft.

Recruits for this field of employment are obtained in each region through open Civil Service Commission competitions.

Candidates must procure, at their own expense, a prescribed certificate of good health. Graduation from a high school or technical school is a prerequisite and additional credits are given for further academic training. Candidates must have good enunciation. Credits are given for recent experience in aviation.

Visual Control: Successful candidates are posted to either of two schools, one in Toronto for trainees from Eastern Canada and the other in Winnipeg for those from Western Canada. Trainees spend three months in school, receiving theoretical instruction and synthetic training in VFR control.

On completion of this phase of the program, the trainee is posted to a control tower for three months of practical on-the-job training.

During the first six months, the trainee will have written examinations on air regulations, air traffic control rules and procedures, and meteorology. He will have been granted a restricted radio-telephony licence.

On successful completion of the six months program, he receives an "Air Traffic Controller's Licence" and is classified as A.T.C., grade 1. After a minimum of six months additional experience, he may qualify for A.T.C.-2 and after another year, for A.T.C.-3.

Instrument Control: At any time after completing six months experience as a VFR controller, he may apply for IFR training. If accepted, he attends an IFR training school, one of which is located at each control centre. The course consists of 16 weeks full-time training in theoretical and synthetic IFR control. On completion of the course, the trainee is posted for practical training at the centre or at the approach control unit in which he will be employed. This training period varies from six weeks to three months, depending on the complexity of the operation and the trainee's ability and aptitude.

When he has successfully completed his period of practical training, the controller's licence is endorsed for "area control" or for "approach control" as appropriate.

If he is employed in the centre, he is promoted to Air Traffic Controller-grade 4. If employed in an approach control unit, he is promoted to whatever grade is applicable according to the volume, nature and complexity of the work performed.

When the IFR controller has gained some practical experience in IFR control, he will receive further training in radar theory and control procedures. If he writes a satisfactory examination paper on this subject, completes a minimum of 100 practice runs vectoring aircraft on to a navigation facility, and demonstrates ability to apply radar separation to aircraft departures, he is then qualified as a radar controller.

Air Services School

Plans have been made to establish a new Department of Transport school to meet the training needs of Air Services. This school will be operated at Uplands Airport in Ottawa. It will replace eight department schools now being operated at Moncton, Montreal, Toronto, Winnipeg, Edmonton and Vancouver for newly recruited personnel. It is hoped that the school will be in full operation in 1960.

This centralized program will not only be more economical to operate but will also provide a high standard of training to meet the special technical needs of Air Services.

The school is being organized to meet the following anticipated enrolments from the three branches of Air Services.

<u>Branch</u>	<u>New Recruits</u>	<u>Regular Employees</u>	<u>Total</u>
Telecommunications	75	336	411
Meteorological	160	16	176
Civil Aviation	120	-	120
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TOTALS	355	352	707

Approximately 155 trainees will be in attendance at all times. The staff will consist of 22 full-time and part-time instructors, a superintendent, a maintenance technician, a stenographer and a clerk.

Indoctrination training will be provided for newly recruited personnel in the classifications of air traffic controller, meteorological technician, meteorological teletypist, and radio operator. Special courses on electronic equipment, such as radar, radio, teletype, and forward scatter, will be provided to improve the knowledge and efficiency of persons on the Department staff as radio technicians and radio inspectors. Specialized training in the electronic field may also be provided for other employees.

Seventeen courses, varying in duration from one to four-and-one-half months, have been planned to meet the immediate requirements for special training which is not available from other government or private agencies or which can be given more effectively and economically in courses conducted by the Department.

The following table indicates the nature, duration and anticipated enrolments in these full-time courses.

Table 11.

Anticipated Enrolments and Duration of Courses, Transport School

Trainees	Nature of Course	Duration	Trainees per Class	Classes per Year	Trainees per Year
Air Traffic Controllers*	Indoctrination for Empl't.	12 wks.	30	4	120
Radio Operators*	Procedures and Weather Observing	4½ mos.	25	3	75 (to increase)
Radio Operators	Ionosphere Services	2 mos.	8	1 initial	8
" "	Monitoring Services	2 mos.	8	1 adv.	16
" "	Teletype Operation	6 wks.	12	2	24
Radio Technicians	Forward Scatter Equip't.	1 mo.	12	1	12
" "	Aircraft Radio	1 mo.	4	3	12
" "	Calibration Air Equip't.	1 mo.	4	3	12
" "	I.L.S./V.O.R. Theory	8 wks.	12	6	72
" "	Teletype Mt'ce.	1 mo.	12	2	24
Radio Technicians & OIC's	Mt'ce. of Radio Teletype and Mufax	3½ mos.	12	3	36
Radio Technicians	Teletype Error Correction	3 mos.	12	3	36
" "	Radar	7 wks.	12	3	36
Lightkeepers	Marine Radio Beacon	2 mos.	12	2	24
Radio Inspectors	Procedures of Inspection	1 mo.	12	3 to 6	36 to 72
Meteorological Technicians*	Indoctrination for Empl't.	3 mos.	30	4	120
Meteorological Teletypists*	Teletype Operation and Procedures	3 mos.	20	2	40
TOTALS			245	49	719

*Courses will be given to newly recruited personnel prior to assignment to the positions for which they have been selected.

Newly recruited trainees are paid a fixed allowance while in training prior to assignment to regular employment. Necessary travelling expenses are paid by the government. Regular employees who are sent to school classes continue to receive their salaries plus a fixed per diem allowance of \$6.00 and necessary travelling expenses.

It is estimated that the costs of training in the new school will average less than \$1.50 per student hour or about \$530 per year for each trainee, excluding salaries of trainees who are regular employees and allowances of new recruits in pre-engagement courses.

Recent Technical Training Programs

Since the primary purpose of this survey of training facilities in government departments and agencies is to gather information about the nature and extent of technical and trade courses affecting the pool of skilled manpower in Canada, it may be helpful to list such courses separately and to indicate the purpose, duration and enrolment in each of the courses conducted by the Department and by various other agencies.

A list of the technical courses planned for the new school was given in the preceding section. With the exceptions of the two courses for air traffic controllers and meteorological technicians, the proposed school courses are not listed in the following table.

Table 12.
RECENT TECHNICAL TRAINING PROGRAMS - DEPARTMENT OF TRANSPORT 1957-59

Course	Purpose or Objective	Conducted by	Duration	Enrolment Recent	Enrolment Continuing	Remarks
<u>Departmental</u>						
Meteorological Technicians	to train newly recruited personnel in weather observing and map plotting	Dept. staff	3 mos.		120 per yr.	to continue in new school
Air Traffic Control (VFR)	to train personnel to operate control towers	Dept. staff	24 wks. (12, school; 12, TOJ)	240	120 per yr.	to continue in new school
Air Traffic Control (IFR)	to train personnel to operate control centres	Dept. staff	6 mos. TOJ	90	90 per yr.	until fully staffed
Radiosonde	to train operators of special equipment	Dept. staff	2 mos.	60	60-70 per yr.	2 full-time schools
Radio Technicians, Gander	to provide basic training for certification of technicians	Instructor from industry and class	6 mos. TOJ	5	-	Pendix equipment
Decca Training	to familiarize technicians with Decca radar equipment	Instructor from industry	5 days	22	-	operated at 3 centres
Snow Removal Equipment	to train operators in proper handling techniques	Dept. staff & instructor from industry	1 wk.	50		as may be required
Special Training Conferences	to study new equipment and operations	Dept. staff	3 days to 2 wks.		varies (5 on 6 per year)	for inspectors, technicians and supervisors
<u>Other Gov't Agencies</u>						
Marine Scholarships	to upgrade certification of ship's crews in navigation and engineering	Approved schools	3 wks. to 2 mos.	10		Dept. pays fees and expenses while in school
Fire Investigation	to meet Dept. requirements for trained fire investigators	RCMP	1 wk.	2		as may be required
Ice Observers	to train meteorological personnel for	U.S. Navy	5 wks.	11	-	as required

Course	Purpose or Objective	Conducted by	Duration	Enrollment		Remarks
				Recent	Continuing	
Engineers (electronics)	to acquaint junior engineers with equip't. peculiar to this Dept. and FAA	Federal Aviation Agency, Oklahoma, USA	3 to 4 mos.	10	approx. 10 per yr.	no tuition fees
Outside Agencies						
Marine Engineering - Apprentices	to develop a nucleus of well-trained marine engineers for future senior vacancies	7 shipyards	8 yrs. (5 in yard, 3 at sea)	9	as authorized	a continuing need
Radio Operators	to ensure adequate intake of operators for special training	Schools - private and public	10 mos.	127	120 per yr.	subsidized pre-employment training
Electronics for Instrument Makers	for transition to electronic instruments	Radio College of Canada	14 mos. (2 evenings per wk.)	2		as required
Computer Operators - Programming		Manufacturer	1 wk.	6		as required
Raytheon	to train technicians for maintenance of this new radar equipment	Manufacturer	8 wks.	90		as required
Aircraft Mechanics - Correspondence Course	to enable employees to acquire license as mechanics	ICS	2½ yrs.	3		as required
Helicopter Mechanics	to enable aircraft mechanics to maintain helicopters on ships	Spartan	6 wks.	5		as required
Link Trainer & Flight Simulator Training for Pilots	to maintain ability to fly on instruments	DOT and outside Co's	varies	10		as required
Pilot Training - Seaplane	to qualify inspectors to endorse licenses and certify airworthiness	School or company	20 hrs.	5		as required
Ship Inspectors	to acquaint inspectors with nuclear propulsion theory and practice	Harwell Reactor School, Eng.	4 mos.	2		2 more planned
Radar Technicians	maintenance training	Manufacturers	varies 8 wks. 4 wks. 4 wks.	90 48 40		a continuing need

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

Introduction

The Training and Welfare Section of the Personnel and Office Services Division organizes and supervises staff training programs in the Department of Mines and Technical Surveys, similar to those provided in other departments.

Orientation courses, supervisory training, and other courses of a non-technical nature are conducted by the staff of the Department. Trainees are also sent to the various administrative, supervisory and technical courses operated by the Civil Service Commission. Approximately 300 employees attend courses each year.

About 20 officials are granted "Educational Leave" each year and a considerable number attend conferences, seminars and short courses under the program of "External Training".

All of the foregoing types of training have been described in the reports on the Civil Service Commission and the Departments of Veterans Affairs and Transport. This section of the report deals with organized or supervised programs of a technical nature which are provided for employees of the Surveys and Mapping Branch and the Mines Branch of the Department.

Surveys and Mapping Branch

General Observations: This branch of the Department consists of five divisions or services, namely, Geodetic Survey, Topographical Survey, Legal Surveys and Aeronautical Charts, Hydrographic Service, and Map Compilation and Reproduction.

Each of these divisions provides some form of specialized training for both junior and senior technical officers, and also for professional and administrative personnel. Relatively little of this training takes the form of organized programs or courses attended by groups of trainees. Most of the training for senior officials and professional personnel is obtained through experience on the job or by attendance at special courses and training institutions outside the Department. An exception is the special course for senior officials now being organized by a joint committee of the Branch.

Course for Senior Officials: The purpose of this course is twofold: to broaden the background of technical knowledge of each trainee, and to familiarize senior officials of each division with the responsibilities and activities of the other divisions.

The course will cover a three-month period of full-time instruction during four and one half days per week. It is in the nature of post-graduate training except that some of the work will be at a lower level. Eleven officers of the Branch and one representative of the Army are expected to be in attendance.

Special Conference: A two-day conference or colloquium was held recently in Ottawa, to discuss the problems and requirements of university training for prospective surveyors. Over 70 persons attended, representing universities and provincial and federal governments. Some speakers came from the United States. Those present agreed that the development of modern techniques and instruments have made it necessary to provide more and better theoretical instruction and practical training in this field than is now being given to engineering students.

Map Compilation and Reproduction Division: (a) Map Draughtsmen.

The skills and techniques of map draughtsmen employed by this division of the Branch have undergone changes on several occasions. During the past forty years, lithographic stones have been replaced by etched copper plates and these in turn have been replaced by transparent plastic sheets. "Smooth draughting" or hand penmanship has recently been replaced, almost wholly, by "map scribing" - the drawing of lines by engraving tools or scribes. Typography has, in many cases, replaced hand lettering. Nevertheless, the development of a skilled map draughtsman is still a slow process of training-on-the-job extending over a period of ten years or more and involving the acquisition of unique skills. The map draughtsman must not only be a skilled penman and engraver but must also understand the various techniques and procedures of map design and reproduction, for which no special training is available in schools.

Failure to recruit a sufficient number of trained or partly trained draughtsmen in this and other fields led to the establishment by the Civil Service Commission, in 1953, of a special school for this purpose. Young inexperienced trainees were recruited from secondary schools through open competition. They were then given six months of pre-employment basic training which, for some trainees, included elementary map draughting. While in school they received a fixed living allowance and, on completion of the courses, were assigned to existing vacancies as student draughtsmen. Two groups or classes were trained, of which about 35 trainees were assigned to the Map Compilation and Reproduction Division for continued training-on-the-job.

The development of the technique of map scribing and other techniques in map reproduction have not only increased productive capacity but have made it possible to place trainees on productive work after a few months of post-employment training. Consequently, no further school courses have been found necessary.

The staff of about 90 map draughtsmen, both male and female, is now maintained by an annual intake of four or five new recruits. Under the old techniques, the Division lost as many as 17 draughtsmen to industry in a single year. Now that industry is adopting the new techniques such losses may again become considerable.

A system of supervised training-on-the-job has been developed under which selected skilled map draughtsmen act as training supervisors, each being responsible for a group of about eight students and junior

draughtsmen. All learners and draughtsmen are provided with cartographic manuals which explain and illustrate the standard procedures, lines, lettering, and operations for maps drawn to a specified scale. The complete process of "map reproduction using the negative engraving technique" is explained and illustrated in a bulletin prepared by the Chief Cartographer and published by the Department.

A newly recruited student-draughtsman spends the first three or four months on non-productive assignments under close supervision. He is then assigned to the easier operations on actual map reproduction and may advance according to the following minimum schedule as established by the Civil Service Commission:

Student draughtsman	- 2 years (including above 3-4 mos.),
Draughtsman 1	- 2 years,
Draughtsman 2	- 2 years,
Draughtsman 3	-
The Division may require longer experience than the above minimum standards.	

Annual salary increments are provided for each grade with the exception that the student draughtsmen get semi-annual increments.

(b) Map Printing Tradesmen

When the maps have been drawn and the negatives engraved by the draughting section, the final copies for distribution are printed by the lithographic process. Skilled workers in various printing trades are employed for this work.

There is no formal system of training or apprenticeship. Advancement is by reclassification in accordance with the following schedule:

Learner (litho or photo)	- 2 years
Assistant (l or p) 1	- 2-3 years
" " 2	- 2-3 years
" " 3	- 3-4 years

All classes beyond assistant (litho or photo) 3 are qualified tradesmen. In the pressroom, a press feeder may be held at the assistant 2 level until he demonstrates some ability as an operator. As a senior feeder or feeder-operator he may be reclassified to assistant 3. Advancement beyond this level will depend on the availability of positions and presses. Operators may be classed as litho printers 3 or 4, depending on the size of press they operate.

Consideration is being given to proposed revisions of reclassifications and schedules of salary increases so that learners who show promise may be advanced to the classifications of tradesmen, i.e. compositor, plate maker, camera operator, and pressman, in from six to 11 years.

Hydrographic Service: This division of the Surveys and Mapping Branch is responsible for the charting of all navigable waters in Canada. It operates a fleet of ten survey vessels and forty-nine launches and prepares its own charts which are printed by the Map Compilation and Reproduction Division. It has issued approximately 800 charts and eleven volumes of pilots and sailing directions, most of which are constantly under review and revision.

(a) Nautical Chart Surveyors

Persons to be employed on survey projects, as potential hydrographers or nautical chart surveyors, are recruited from three sources, namely: university graduates in engineering; navigation officers on foreign-going vessels; and persons with several years of experience in land survey work, including responsible use of transit and level.

New recruits are given two brief indoctrination or refresher courses before being employed as assistant surveyors. The first course consists of two months of full-time training in computations, i.e. the mathematics of hydrographic surveying, together with instruction in field and office procedures, note keeping, etc. This is followed by one month of training on practice projects, in the use and care of hydrographic instruments. Short courses are also given in the use of electronic and sonic equipment.

A surveyor normally advances on the basis of demonstrated ability, to a position of senior assistant, then after a number of years of experience may become an officer-in-charge of a party.

Inexperienced university graduates in engineering recruited for this work are classified as engineers, Grade 1, and proceed to higher grades as experience justifies. Non-engineer graduates are classified as technical officers and advance to higher grades on the same basis. Consideration is being given to the establishment of new classifications and grades for this work.

Survey parties prepare detailed field sheets for each project and from these the final charts are prepared by compilers and draughtsmen.

(b) Map Computers and Compilers

The field sheets and notes of survey parties are used by the Computing and Compiling Section to determine the layout and specifications for each chart and to prepare a compilation copy of the proposed chart for the information and guidance of the draughting room. The compilation copy, which is prepared by hand, delineates the area to be covered; the scale of the chart; and the information to be given by the chart regarding water depths, navigational aids, topographical features, etc.

Compilation of nautical charts requires a knowledge of all steps in the construction and processing of such charts, including the use of field survey data, navigational requirements and cartographic knowledge. A grounding in secondary school mathematics is essential and a basic knowledge of draughting is desirable.

Beginners in this field are recruited, through open competition, from young people with at least Grade XI schooling and preferably with experience in a closely related occupation. They are trained on the job under the supervision of senior chart compilers and supervisors.

Inexperienced recruits are employed as map computers and compilers, Grade I. They may be upgraded or reclassified to higher grades on the basis of demonstrated ability, length of service, and recommendation of supervisors.

(c) Chart Draughtsmen

Most of what has been written about map draughtsmen, in discussing Map Compilation and Reproduction, applies equally to chart draughtsmen employed in the Hydrographic Service.

Beginners in this classification are selected from eligible lists established by the Civil Service Commission through open competition. Candidates may be of either sex and must have high school education, preferably graduation. They are required to pass a general intelligence test and an aptitude test consisting of the copying of a drawing, or blue line chart, prepared by the Department.

Successful candidates start as student draughtsmen and may be advanced, on the recommendation of the Chief of Section, but must have the minimum of experience outlined in the following schedule of Civil Service standards:

Student draughtsman	- 2 years
Draughtsman 1	- 2 years
Draughtsman 2	- 2 years
Draughtsman 3	

The Division may require longer experience than the above minimum standards.

Draughtsmen 3 may advance through reclassification or competition to supervisor 1, 2 or 3. Each supervisor is responsible for a group of approximately six draughtsmen including at least one or two persons who require instruction as well as supervision.

(d) Litho Learners

The lettering and numbering on field sheets and compilation copies of charts are done by hand. On the fair drawings and final copies, however, these operations have been replaced, almost wholly, by typography. Titles, names, and numbers indicating water depths, contour heights, etc. are set by hand and printed on both sides of very thin plastic sheets. They are then cut out and planted or patched on the charts by the draughtsmen. The type setting and the printing, on small specially designed presses, are performed

by a few employees classified as "litho learners" and "litho assistants". They are specialists, with certain combined skills of hand compositors and press operators, and are trained on the job.

Topographical Survey: Most of the officers in charge of field parties engaged in surveying for the production of maps are engineers who have graduated from universities. The recruitment and training of surveyors are practically the same as for the Hydrographic Services. Non-university graduates are classified as technical officers. They are recruited as junior assistants and may be advanced to technical officer, Grade 7, which is equivalent in salary to engineer, Grade 4.

Most maps in Canada are now prepared from a combination of field notes and field sheets prepared by topographical surveyors and from vertical aerial photographs. Most of these photographs are taken by private organizations operating under contract with the Department.

(a) Map Computers and Compilers

The preparation and assembly of topographical maps requires highly specialized skills and technical knowledge.

The function of map computers and compilers in topographical map making is the same as, or very similar to, that of persons employed by the Hydrographic Service in the same classification. However, there is considerable difference in the operations and techniques. The principal difference is in the degree to which photogrammetry is used in the compilation of topographical maps, as compared with nautical charts.

Beginners in this technical occupation are recruited from young persons, male or female, with at least junior matriculation standing and preferably with senior matriculation or one or two years in university. They are selected from eligible lists prepared by the Civil Service Commission. Names are listed in the order of standing in open competition and examination.

Candidates appointed as computers and compilers, Grade 1, are given a series of tests for suitability followed by approximately three months of intensive full-time training before being placed on regular production work under supervision.

A map computer and compiler must be able to interpret and compile map detail from aerial photographs and to work for hours at a time on various types of stereoscopic plotters. This requires good normal vision and a high standard of stereoscopic acuity. Three tests are given to new recruits and each is tested annually during his full period of employment.

During the first five to 15 days of employment the beginner is assessed for native abilities and suitability for this work.

He is then placed in the planimetric section for one month's basic training on compilation methods in which stereoscopic plotters are not used.

On completion of this phase he is given a five- or six-week training period on stereoscopic plotting instruments (multiplex). He then spends a probationary period of three weeks on regular production work during which period he is expected to attain normal productivity on the simpler operations.

All trainees are closely supervised during the full training period. The time spent by a supervisor instructing and checking depends on the number of learners for whom he is responsible. Any supervisor who is in charge of from six to ten trainees spends his full time on training activities.

Computers and compilers, Grade 1, receive semi-annual increments in salary, on the recommendation of their superiors. Higher grades have schedules of annual salary increments.

The normal periods of service in each grade before being re-classified on recommendation are:

Grade 1 to Grade 2 after 2 years
Grade 2 to Grade 3 after $2\frac{1}{2}$ years
Grade 3 to Grade 4 after 2 - 3 years.

The normal practice is to upgrade juniors on the basis of accumulated knowledge and general proficiency.

There are three types of training programs conducted by the Department for map computers and compilers:

1. The regular programs for employees of the Department as outlined herein.
2. Specialized intensive training programs in one or more divisions of the classification, for employees of other government departments or agencies. These vary in length from a few weeks to a few months.
3. Specially prepared training programs, up to one year in duration, for government-sponsored trainees from other countries, under the Colombo Plan.

The following breakdown gives some idea of the nature and scope of the instruction provided in the full-time, indoctrination training program of the Topographical Survey:

Requirements

1. High school graduation or equivalent.
2. Ability to remove all parallax from the stereoscopic model and read the floating mark within very close limits.
3. Ability to develop a topographic sense.

Testing

1. Multiplex acuity test - including Y parallax evaluation, X parallax evaluation, and contour evaluation.
2. Zeiss stereoscopic evaluation card.
3. Keystone 46A - occupational visual survey telebinocular test.

Time Allotments

1. 5 - 15 days on multiplex equivalent, including model overlap, horizontalizing, and contouring.
2. 30 - 60 days background photogrammetry, including photo interpretation, radial line method, slotted templet, and sketching
3. 20 - 30 days intensive multiplex training.

Multiplex Training (Preliminary), Part I

<u>Topic</u>	<u>No. of days</u>
Introduction - general coverage of equipment	
Primary settings	$\frac{1}{2}$
Projector movements - screws etc.	$\frac{1}{2}$
Orientation - introduction	1
" - procedure drills - one and two projector	4
Two projector horizontalization	4
Planimetry and topography - countour types plotting aids	10 - 20
Projector movements - individual overlap adjustment*	
K conditions and their removal*	
Procedures for relative orientation of irregular models*	
Total time -	30 days

Advanced Multiplex Training, Part II

Strip to be set up as a bridging operation.
Strip to be set up as an extension operation.
Adjustment of photogrammetric control.

Approximately 200 persons have received such training since the inception of the formal program.

Supervisors are given instruction in the technique of teaching, as set forth in the Job Instruction Training program operated by the Civil Service Commission.

*Practical application is received throughout training period.

(b) Surveyors - Co-operative Training Program

Arrangements have been completed this year for the inauguration of a co-operative plan for training students in engineering at Waterloo College. The plan calls for two alternating groups of students who will spend approximately half time in college and the other half in the Department, where they will receive instruction in survey, photogrammetry, and computations. A complete program has been developed which, it is expected will be beneficial to all concerned.

Legal Surveys and Aeronautical Charts Division: (a) Dominion Land Surveyors

There are no organized or supervised programs in this Division for the training of technical staff. Technical skill and knowledge is acquired through experience on the job and through self study for examinations. All senior officials and professional staff (including all chiefs of field parties) are required to be commissioned Dominion land surveyors or, in certain instances, commissioned provincial land surveyors.

The responsibility for commissioning Dominion land surveyors rests with the Board of Examiners, a statutory body appointed under the Canada Lands Surveys Act. The Board conducts its own examinations annually in Ottawa and other major centres across Canada. The Surveyor General is automatically the chairman of this Board, which otherwise has no connection with the Division.

A person admitted to the office staff of the Division, whether on Legal Surveys or Aeronautical Charts work, must be a high school graduate or equivalent. On admission he is assigned to one of the office groups under a group supervisor who is then responsible for his on-the-job training in the technical skills required in the office work.

Before a man is assigned to a Legal Survey field party as an assistant, he is usually required either to have passed the preliminary Dominion land surveyor examinations or the provincial equivalent. Thus on his own initiative through private study, a member of the office staff may become a field assistant by passing certain professional examinations.

The field assistant is usually articulated to his party chief under the provisions of the Canada Lands Survey Act. In the contract of articles the surveyor undertakes to instruct the pupil in the science of surveying and the period of articles becomes in effect a period of on-the-job training. In normal circumstances the period of articles is three years of which one year must be spent on field work. Where the articulated pupil is a university graduate, however, this period is reduced to one year with six months in the field. At the discretion of the Board of Examiners, commissioned provincial land surveyors may be exempted all or part of the normal period of articles.

The articulated pupil is usually able to pass the DLS examinations after an intensive course of study on his own and there has been no need to establish any formal training program in the Division to maintain the supply of commissioned land surveyors. However, persons on the staff are always encouraged to obtain their commissions both as Dominion and provincial land surveyors.

A Dominion land surveyor who is also commissioned to practice in one or more of the provinces is generally quite adequately qualified technically to assume responsible positions in the Division.

(b) Dominion Topographical Surveyors

The Board of Examiners may grant a certificate as a Dominion topographical surveyor to a person who is a Dominion land surveyor, or a graduate of a university or other educational institution approved by the Board who has passed the preliminary examination and who passes an examination in the higher branches of surveying in prescribed subjects.

(c) Bulletin re Examinations

The Department issues a 33-page bulletin setting forth the regulations, rules and instructions of the Board of Examiners with descriptions of the subjects of the various examinations.

The contents include: extracts from the Canada Lands Surveys Act; Canada Lands Survey Examinations Regulations; rules and instructions for examinations; description of the subjects of the various examinations; and a summary of recommended texts and reference books.

The subjects covered by each of the three sets of examination papers are listed as follows:

Preliminary Examination, Dominion Land Surveyor

Arithmetic and Mensuration
Algebra
Plane and Solid Geometry
Plane Trigonometry and Logarithms
Spherical Trigonometry
Physics

Time required, three days.

To pass the examination the candidate must obtain 50 per cent of the marks allotted to each subject.

Final Examination for Dominion Land Surveyor

Analytical Geometry and Trigonometry
Differential and Integral Calculus
Laws governing Surveys in the Public Lands of Canada
Regulations governing Surveys in the Public Lands of Canada
Description of Lands for Deeds
Preparation of Technical Reports
Map Projections, Plans and Draughting
Elementary Photogrammetry and Town Planning
Astronomy
Methods of Surveying; Calculation of Areas and Curves

Theory, Adjustment and Use of Instruments
Elementary Geology and Mineralogy, and Forests of Western and
Northern Canada
Practical Surveying and Observing

Time required, six and a half days.

To pass the examination the candidate must obtain 75 per cent of the marks allotted to each of subjects 3 and 4; 50 per cent of the marks in each of the other subjects.

Examination for Dominion Topographical Surveyor

Part I

Algebra
Plane and Spherical Trigonometry
Analytical Geometry
Differential and Integral Calculus
Descriptive Geometry and Map Projections
Probability and Least Squares

Time required, three days.

Part II

Geodesy
Astronomy (two papers)
System of Canada Lands Surveys: Governing, Topographical, and
Exploratory Surveys
Theory, Construction and Adjustment of Instruments and Theory
of Modern Optical Instruments
Gravity and Terrestrial Magnetism
Meteorology, Geology and Mineralogy
Astronomical Observations

Time required, three and one-half days.

To pass the examination, the candidate must obtain 50 per cent of the marks allotted to each subject.

Mines Branch

General Observations: The technical and scientific services of the Mines Branch are performed by six divisions and a special section for the Navy. They are:

Mineral Sciences
Extraction Metallurgy
Physical Metallurgy
Fuels and Mining Practice
Mineral Processing
Technical Services
Naval Service Laboratory

The professional and scientific staff of the Branch consists of the Director, chiefs of divisions, senior scientific officers, engineers, and scientific officers, most of whom are university graduates in science or engineering, some with post-graduate or specialized training and experience.

The non-professional technical staff is comprised of technical officers, technicians, assistant technicians, mines craftsmen, tradesmen, and helpers.

Tradesmen are employed in the Technical Services Division on the fabrication, installation, repair and maintenance of equipment and special apparatus used by the other divisions and, in special cases, on the construction, alteration and maintenance of buildings. They are paid at the prevailing rate of wages for each trade as determined by the Department of Labour.

Mines craftsmen are employed in other divisions of the Branch in various trades and skilled operations which are normally found in mines, mills and foundries. They are divided into five grades or levels of skill and responsibility, and paid accordingly.

Technicians are employed as assistants to scientific officers in the various laboratories or as supervisors of junior technicians and craftsmen. They work in laboratories on various types of research, analysis, and testing. In shops they are employed on the design, fabrication, and testing of apparatus and equipment used for experimental and production purposes.

Technical officers in this Branch are usually highly qualified persons, with long experience, who are employed on specialized work of an advanced technical nature or who act as foremen or supervisors of groups of technicians.

The general practice with respect to the hiring and training of persons at the trades level is to recruit experienced competent persons, through open competition, and to develop whatever specialized skills and knowledge are required through unorganized training-on-the-job by foremen, supervisors and heads of sections.

For the lower levels of non-professional technical jobs, high school graduates, usually without previous experience or specialized training, are recruited from Civil Service eligible lists.

Beginners start as assistant technicians, Grade 1, or at a higher level according to the nature and complexity of the work to be performed and the qualifications and experience of the recruit. They are advanced, on the basis of ability, performance and recommendation, through the regular salary schedules and grades of assistant technician and technician. Vacancies are filled by Branch, Departmental, or open competition, depending on the availability of suitable candidates.

Although there is no organized program of formal training, all employees, at every level, are encouraged to take advantage of outside training facilities for both general and specialized training. In addition to individual on-the-job training, special group instruction is provided, as required, through lectures and demonstrations by section heads, supervisors and foremen. Occasionally such training takes the form of lectures by outsiders, film showings, or printed matter dealing with specific skills and problems.

The following statements regarding the functions and operations of each division, and statistics indicating the proportion of employees at different levels of classification, may be helpful in gaining a clearer impression of how skilled technical and craft workers are developed in this Branch of the Department.

The figures for each section and classification are approximations but they are sufficiently accurate to indicate the relative numbers of persons engaged in work at the scientific, technical and trades levels. The total number of employees in such occupations within the Branch is approximately 520, of whom 232 or 45 per cent are classified as scientific officers, 20 or .4 per cent as technical officers, 166 or 32 per cent as technicians, and 102 or 40 per cent as mines craftsmen or tradesmen. These figures do not include administrative and clerical staff.

Mineral Sciences Division: This Division employs about 37 professional scientists and engineers and about 33 technicians, at various levels.

Non-professional technical workers are employed in fire assay work, spectrographic analysis, physical chemistry for high temperature investigations, physics and radio tracer experiments, development of electronic circuits, X-ray diffraction, and lapidary work (producing polished sections).

Because of the highly specialized nature of the work in each section, it is necessary to provide individual training-on-the-job. Beginners are selected from high school graduates with above-average intelligence and no special vocational training. The low salary rates for beginners are not attractive to graduates of technical institutes, although one assayer came from the Mining Institute at Haileybury.

Credit may be given for previous training and experience but, with few exceptions, new recruits begin as assistant-technicians and advance through annual salary increments and reclassification, on the basis of increased skills and responsibilities. There were four technicians at Grade 4 level at the time of the survey.

It takes from seven to ten years to advance from assistant-technician, Grade 1, to technician, Grade 1. Reclassification to higher grades may be slower, depending on circumstances such as increase or decrease in the volume of work in any section and the number of staff separations due to retirement, death, and transfer.

Extraction Metallurgy Division: The services and operations of the Extraction Metallurgy Division are divided into three sub-divisions designated as Hydrometallurgical Development, Pyrometallurgical Development, and Research. Each sub-division is headed by a "senior scientific officer". The three sub-divisions are divided into a total of eight sections which are also headed by senior scientific officers at lower grades. Those operations within each section which require advanced technical knowledge and scientific training are headed by scientific officers at different levels or grades. The scientific officers in each section may be assisted by one or more technical officers, technicians, assistant technicians and mines craftsmen, at appropriate levels or grades in each classification.

The head or foreman of the ore treatment mill and pilot plant is a technical officer, Grade 5. He is assisted by technicians, Grade 2, who are responsible for individual operations.

There are 84 employees in the Division distributed as follows: administration, 8; scientific officers, 42; technical officers, 2; technicians and assistants, 28; mines craftsmen and helpers, 4.

Technicians in this Division are employed in about ten different types of jobs or operations, including ore treatment, solution metallurgy, control analysis, mineralogy, pyrometallurgy, corrosion, ferrous and non-ferrous metallurgies.

Technicians employed at or below the level of assistant, Grade 3, are usually transferrable but the specialized nature of the work at higher levels makes such transfer very difficult if not impractical.

Physical Metallurgy Division: This Division deals with the mechanical and fabricating characteristics of metals and alloys. It is comprised of twelve sections including a foundry and a photographic laboratory, but excluding clerical services. The sections which are headed by senior scientific officers include metal physics, non-ferrous metals, refractory metals, ferrous metals, mechanical metallurgy, welding, nuclear metallurgy and special alloys, metal forming, metal corrosion, engineering physics, and non-destructive testing.

Men and women are employed in the various classifications in most of the sections. There are no women in the foundry but the photographic laboratory is operated by three women, classified as assistant technicians. There is one other female assistant technician and one woman is employed in each of the following technical classifications: scientific officer, Grade 2; technical officer 2; technical officer 1; and technician 1. Women may be employed in any classification other than trades. This is typical of all branches and divisions covered by this survey.

The scientific and technical work of the Division is distributed by classification as follows:

		<u>No. on Staff</u>
Senior Scientific Officer, Grade 3	3	8
" " " "	2	7
" " " "	1	<u>17</u>
	<u>Total</u>	32
Scientific Officer, Grade 3	3	13
" " " "	2	6
" " " "	1	<u>1</u>
	<u>Total</u>	20
Technical Officer, Grade 5	5	1
" " " "	4	2
" " " "	3	2
" " " "	2	2
" " " "	1	<u>1</u>
	<u>Total</u>	8
Technician, Grade 4	4	2
" " " "	3	11
" " " "	2	20
" " " "	1	<u>8</u>
	<u>Total</u>	41
Assistant Technician, Grade 3	3	5
" " " "	2	<u>3</u>
	<u>Total</u>	8
Mines Craftsman, Grade 2	2	2
" " " "	1	<u>8</u>
	<u>Total</u>	10
Mines Craftsmen Helper, Grade 2	2	2
" " " "	1	<u>2</u>
	<u>Total</u>	4
TOTAL		<u>123</u>

The foundry staff is headed by an expert with long and varied experience in this field who is classified as technical officer, Grade 5. He is assisted by one technical officer, Grade 3, four technicians, seven mines craftsmen and three helpers.

Because this foundry must deal with metals of all types involving experimental work and the development of new processes and techniques, it is impossible to recruit fully qualified personnel for all operations. Considerable training must be given on the job and it sometimes becomes necessary to send technicians and others to outside establishments for training in the operation of special equipment. Occasionally, experts are brought in to instruct in new techniques.

Similar training is provided for employees at various levels in other sections of the Division.

The only organized training program for technicians in this section was a course consisting of about fifteen one-hour lectures given by Department officers and others, over a period of eight months. It has been discontinued and employees are now encouraged to seek such instruction through evening classes and correspondence courses conducted by educational institutions.

Officers of this and other divisions would like to obtain the services of graduates of such schools as the Ryerson Institute of Technology. It is felt that such persons would make good progress if they could be recruited at the technician 2 level.

Technicians and mines craftsmen in this Division are employed in over 15 different types of jobs and operations.

Fuels and Mining Practice Division: The functions of this Division are two-fold, namely, to carry out experiments and investigations in the development and use of existing fuels of all types, and to develop new methods and processes for the future mining and utilization of fuels, which, for various reasons, are not now used, such as the tar sands of the Athabaska area of Alberta, and deep coal deposits.

The staff is comprised of 62 scientific or professional employees, 32 technical and craft workers, and a clerical staff of nine. There are six technical officers ranging in grade from one to eight, some of whom are regarded as scientific officers; 26 technicians, 12 of whom are Grade 3; three assistant technicians; and three mines craftsmen.

Separate laboratories are operated for solid fuels and for liquid and gaseous fuels. The scientific sections and operations of this Division include fuel and power, special projects, carbonization and gasification, fundamental research, high pressure chemistry, explosives, preparation and standardization, electric equipment and certification, mechanical engineering and combustion, construction and equipment, petroleum engineering, engineering design, mining, sampling and analysis (solid, liquid and gaseous).

In this Division, as in the others, there is no provision on the staff establishment for full-time trainees. All training is provided through supervision and unorganized instruction by section heads and persons who act as supervisors. Pressure of work and the small number of persons employed in each section make it very difficult to give adequate instruction and training. Employees are encouraged to take advantage of outside facilities such as evening classes and correspondence courses.

Trained personnel can be attracted from industry at or above technician 2 level but the relatively few technicians below this level must be recruited as inexperienced beginners. They are selected from Civil Service eligible lists.

Most of the senior technicians and technical officers are persons over middle age who had been trained prior to employment in the Division.

The facilities of this and other divisions are used during summer vacation periods to train university students from other countries who come to Canada under the Colombo Plan. A special training program must be arranged for each of these students, in accordance with his background of training and experience and the nature and extent of the skills and knowledge to be acquired.

Mineral Processing Division: The Mineral Processing Division operates a special plant for the milling and processing of ferrous and non-ferrous metals. It also provides special services in connection with the milling, processing, and testing of non-metallic minerals, ceramics, construction materials, and industrial waters.

The scientific and technical staff consists of 74 persons in the following classifications:

Senior Scientific Officers	- 18 (Grades 3, 2, and 1)
Scientific Officers	- 16 (Grades 3, 2, and 1)
Technical Officers	- 2 (Grades 5 and 3)
Technicians	- 16 (Grades 4, 3, 2, and 1)
Assistant Technicians	- 9 (Grades 3 and 2)
Mines Craftsmen	- 13 (Grades 4, 3, 2, 1, and helper)

Mines craftsmen are employed in the operation of mills and machines on such operations as crushing, screening, grinding, floatation, magnetic separation, and roasting.

Technicians are employed as supervisors of mill operations and as assistants in the laboratories.

It is the policy of the Division to recruit experienced craftsmen and technicians wherever possible. Juniors are trained on the job and specialized training is provided for technicians and others in the same manner as indicated in the reports on other divisions.

Technical Services Division: This Division, which is headed by an engineer, Grade 7, serves the needs of other divisions of the Branch in such matters as the operation of a tool room, machine shop, electrical services, carpentry and cabinet work, welding, sheet metal work, and the provision of guards and watchmen. It fabricates, maintains and repairs special equipment; machines test samples of metals; operates a motor transport service; and provides a general maintenance service in special fields not covered by the Department of Public Works.

The staff includes:

	2 engineers, Grades 3 and 2 (Electrical and mechanical)
	2 technical officers, Grades 4 and 3
	3 technicians, (two Grade 3 and one Grade 1)
	42 tradesmen
	11 helpers or labourers
	15 miscellaneous - storemen, chauffeurs, guards and clerical workers
TOTAL	75

One technical officer is in charge of stores and the other is assistant to the engineer who heads the electrical section.

The three technicians are specialists in their respective fields.

The 42 tradesmen are classified as follows:

1 general foreman, equivalent of mines craftsman 5	
3 foremen, equivalent of mines craftsman 4	
1 " (of labourers) equivalent of mines craftsman 1	
7 electricians	" " " " 4
8 tool makers	" " " " 4
14 machinists	" " " " 3
6 carpenters	" " " " 3
1 motor mechanic	" " " " 2
1 welder	" " " " 2

In this Division, the tradesmen are classified according to trade and paid at the prevailing rates in the area, as determined by the Department of Labour. The foregoing table indicates the grades of mine craftsmen in other divisions who are paid at approximately the same rate as tradesmen in the Technical Services Division. There are no grades or salary increments for tradesmen in this division.

All vacancies are filled by competition and an effort is made to recruit only trained persons with suitable experience.

It has been found necessary, however, to provide some specialized instruction in addition to the training received through experience and supervision on the job.

Tradesmen on most jobs spend an average of about one hour of working time per month viewing instructional films prepared by industry and governments. They also attend day and evening lectures given by experts and engineers in various fields, some of which are given within the Branch. Tradesmen or technicians are sometimes sent to manufacturing plants to receive intensive training on the operation and care of new types of equipment. Three electricians are attending evening classes at the University of Ottawa and others are enrolled in suitable correspondence courses. Occasionally, specialists from major manufacturers of machine

tools have been brought in for brief periods to give specialized training to machinists and toolmakers. This has been done for precision grinding on cylindrical grinders, and for contour sawing on band saws.

Naval Service Laboratory: This special section was developed during World War II for the fabrication of special sonar equipment used on Canadian ships. It has been continued, on a greatly reduced basis, to service existing equipment and to manufacture such equipment for new naval ships.

The laboratory is headed by a technical officer, Grade 8. The technical staff consists of:

1 technician, Grade 1	- assembling section
1 mines craftsman, Grade 5	- laboratory
1 " " Grade 3	- testing room
7 " " Grade 3	- testing assembly, lapping and crystal inspection
1 " " Grade 2	- lapping section

The mines craftsmen were formerly employed as tradesmen, at the prevailing rate for each occupation. They are now paid on a salary basis and graded according to experience, ability and the degree of responsibility and skill required for each job or operation.

The special skills required have been developed by an informal system of supervised training-on-the-job. Previous mechanical or machine shop experience is essential for some beginners, especially those who operate the lapidary grinders and who must work to very close tolerances.

DEPARTMENT OF PUBLIC PRINTING AND STATIONERY,
NATIONAL PRINTING BUREAU

Introduction

Unorganized training-on-the-job has long been provided for skilled operators and craftsmen employed in the Department of Public Printing and Stationery. Organized apprenticeship, however, is a new development which started in 1957.

Such training was found necessary to meet the continuing need for printing craftsmen and to ensure a reliable source of supervisory staff familiar with the special problems and procedures of the Department. The personnel establishment of the Production Branch of the National Printing Bureau which is the main printing plant of the Department, situated in Hull, Quebec, now makes provision for stipulated numbers of trainees in various skilled printing trades. The system is being extended to cover skilled maintenance trades.

Staff training for administrative, supervisory, and clerical employees is also provided under programs as outlined in the reports on the Civil Service Commission and the Department of Veterans' Affairs. Such programs within the Department are in the early stages of development.

This report deals primarily with the training programs for apprentices in skilled trades. All of these trades have counterparts in civilian industry and the majority of skilled workers in such trades are recruited from industry. Such employees are paid at prevailing rates. Most of them are members of unions.

The occupations affected by this system of training may be grouped in three classes as follows:

Letterpress trades classes, including proofreaders, bookbinders, folding-machine operators, compositors, linotype operators and machinists, monotype operators and machinists, castermen, paper cutters, pressmen, stereotypers, and ruling machine operators.

Lithographic trades classes, including camera operators, litho feeder operators, litho pressmen, negative operators, and stripper and layouters.

Other prevailing rates classes, including machinists, carpenters, electricians, motor mechanics, office appliance repairmen, painters, plumber and pipe fitters, and welders.

Organization and Control

Departmental training programs are organized and supervised by the Staff Training Division of the Administrative Services Branch of the Department, working in close cooperation with the appropriate divisions of the Production Branch.

Each program is designed to meet the immediate and prospective training requirements of the trade or trades involved and to provide a nucleus of well trained craftsmen suitable for advancement to supervisory and senior positions. The number of trainees is limited by the prevailing ratio of apprentices to journeymen in each trade, as fixed by agreement between the unions and the printing industry.

Apprentice Training Programs

There are five organized plans or programs of training for skilled workers in the various printing and maintenance trades at the Bureau.

Composition and Bookbinding: A three-year program is provided for advanced training of young persons who have had outside training and experience in either hand composition or bookbinding, equivalent to three years of apprenticeship in these trades.

Trainees are selected by Civil Service competitive examination from three types of candidates, namely:

Graduates of the three-year printing courses at the Montreal School of Printing or the Ryerson Institute of Technology in Toronto;

Graduates of provincial and municipal technical and vocational schools who have specialized in printing and have had at least one year's experience in either trade; and

Persons who have served three years of apprenticeship or the equivalent in either trade.

Successful candidates commence training in the fourth year of a six-year training program at 60 per cent of the prevailing journeymen rate.

Twelve such trainees were appointed in 1957, six in 1958 and five in 1959. These were selected from eligible lists which are established by open competition about every second year. The continuing number of beginners from outside sources is expected to be about six or eight.

Trainees entering the type setting or composition department are rotated among various jobs in the linotype room, monotype room, job printing room, and stone division. During the last six months of the apprenticeship period trainees are assigned to the particular trade or specialty in which they will be employed as journeymen on completion of training. These are linotype operators, monotype operators, and hand compositors.

Trainees entering the bindery division are assigned to either the pamphlet bindery, the book bindery, or the ruling room. Those in the pamphlet bindery become folding machine operators and paper cutters. Those in the book bindery become bookbinders, while those in the ruling room specialize as ruling-machine operators.

Lithographic or Offset Trades: Organized training for skilled jobs in the lithographic or offset department is reserved for young persons employed as "printing and stationery appliance operators" in the twelve Ottawa units and sixteen outside units operated by the Department across Canada.

Operators from these units are selected for advanced training in offset trades on the basis of competitive examination. Successful candidates are required to undergo a five-year program of supervised on-the-job training to qualify for journeyman status in the trade of "stripper and lay-outer" or "plate maker". No training is provided in camera work.

Litho Pressmen: Some appliance operators selected for training are first promoted to "feeder operators" on a litho press. They may then be selected, through competitive examination, as "press trainees". Those chosen undergo an additional four-year program of supervised training-on-the-job to qualify as litho pressmen.

Letterpressmen: Trainees in the letterpress division are selected, by competition, from persons employed in this division as "press assistants". These assistants are recruited from industry after having served a four-year term as "letterpress apprentices". Those selected for further training, to qualify as journeymen "letterpressmen", must undergo a three-year period of supervised training-on-the-job. The number of "assistants" selected for such training depends on the number of anticipated vacancies for "letterpressmen".

Non-printing Mechanics: The Department of Public Works is responsible for the construction and maintenance of the building but the Printing Bureau employs a considerable number of mechanics and helpers who are responsible for the installation, maintenance, and repairs of the printing equipment and other special equipment in the building. While there is no official program of apprenticeship in these trades, certain helpers have been selected to undergo a three-year program of training-on-the-job which it is hoped will develop competent mechanics for this special work.

Rating and Examinations

The foregoing programs of apprenticeship make no provision for classroom instruction or prescribed courses in technical and related academic subjects but provision is made for rotation of jobs in each

division or specialty of the work covered by the trade. In addition to the training received from foremen and journeymen, group instruction is provided by the Training Division in related trade knowledge and the techniques of other printing trades. The purpose is to ensure that future journeymen will have a general knowledge of the functions and operations of the Bureau and will appreciate how their work is related to that performed by other trades and divisions of the Bureau. Organized visits are made to paper mills and to other nearby printing establishments as well as to the various divisions of the Bureau.

Records are maintained by the Staff Training Division including rating forms, personal suitability assessments and the results of semi-annual examinations.

These examinations usually consist of ten questions prepared by the Training Division and based on the work covered by the apprentice during the preceding six months.

Examinations are conducted by Apprentice Examining Boards chaired by the Training Division and consisting of from three to five representatives of management, organized labour and the division or shop directly concerned with each case.

Those trainees who pass the examination and have satisfactory records of rating and suitability are advanced six months in their apprenticeship periods and receive an increase in pay of approximately 5 per cent of the journeyman rate. Apprentices who fail must serve an additional six months before being upgraded.

All apprentices recruited from outside, under the plan for composition and bindery trades, commence in the fourth year at 60 per cent of the journeymen rate. Those with more than the stipulated minimum training and experience and also exceptionally bright trainees, while commencing at the same level, may be given credit for as much as one additional year, thus reducing the over-all training period from six to five years. Such credit is usually given at the end of the training period but increases may exceed the normal amounts to compensate for unusual ability or experience.

Similarly, apprentices recruited from within the Bureau or Department may be given partial credit for experience acquired in the trade for which they are being trained.

Number of Apprentices

There were 50 apprentices in training in the printing trades during the fiscal year 1957-58, of whom 17 were in composition, 13 in lithography, 12 in letterpress, and eight in bookbinding. Four trainees were promoted to journeyman status during the year. The annual intake of apprentices under the four programs is expected to reach about 14 of whom about eight will be recruited from outside sources.

Under the plan for maintenance mechanics, one apprentice completed training in the plumbing and pipefitting trade during the past year and there was one trainee in welding.

Department Courses

In addition to the apprenticeship programs outlined in the preceding section, the Training Division is responsible for the organization and operation of special courses as required to meet specific training requirements for any group or classification of employees.

Planning and estimating courses were attended by 78 skilled journeymen during the fiscal year 1957-58. Two courses of 49 hours duration were given concurrently in English and in French.

Supervisory tradesmen: To meet an anticipated need for a limited number of supervisory tradesmen with a general knowledge of the functions and operations of the Department, a special course consisting of twelve evening sessions of two hours each was given during the months of February and March 1959. There were two groups of trainees, one consisting of 46 supervisors and the other of 75 potential supervisors.

The first six sessions consisted of twelve lectures by experts on the various printing functions and operations of the Printing Bureau. The remaining six sessions were shared by 15 lecturers who dealt with such functions and activities as preventive maintenance, outside printing production, accounting and auditing, publications, purchasing and supplies, industrial relations, promotions and personnel procedures, efficiency rating, the role of the supervisor, and the organization of the Government of Canada and the Department of Public Printing and Stationery.

A one-week course or seminar on department and branch functions and procedures was conducted for unit supervisors across Canada.

Other Training Programs

The Department has not made use of the provision for "educational leave" but a number of departmental employees have been trained each year under the "external training" plan operated through Treasury Board and the Civil Service Commission. The Department also makes use of courses provided by the Civil Service Commission for administrative officers and stenographic personnel.

Thirty employees, representing management, production and labour, attended a course in "work measurement indoctrination" conducted by Stevenson and Kellog Ltd. It consisted of eight lectures, each of two hours duration and given once a week during working hours.

DEPARTMENT OF PUBLIC WORKS

The Department of Public Works follows the general policy of other government departments and agencies by filling vacancies, wherever possible, through recruitment of suitably trained personnel.

Nevertheless, some specialized training has been found necessary both for new recruits and for established employees.

Considerable use is made of specialized training under the External Training program, usually to improve the proficiency of engineers and other professional employees. The Department also sends employees from headquarters to the various courses operated by the Civil Service Commission. With few exceptions, training for skilled workers and technicians is provided through experience and unorganized training-on-the-job.

Boring Technicians

Several positions of "boring technician" were established, in 1957, in the district offices of the Harbours and Rivers Branch. Early in 1959 it was deemed necessary to bring ten such technicians to Ottawa for a six-week intensive, full-time course on soil sampling and the handling of new soil-boring equipment. This course has assisted in establishing standard procedures in this field and new recruits will in future be given informal training-on-the-job under the supervision of professional engineers.

Instrument Men

Difficulty in recruiting a sufficient number of competent instrument men for highway construction projects led to the establishment, three years ago, of a two-week, full-time course at Banff, Alberta. This course is attended by classified and prevailing rate employees who work with engineers on the location and construction of federal government highways.

The course is conducted by department engineers and is designed to assist in developing standard procedures for instrument men and to overcome the deficiencies of persons who are employed in this capacity following experience gained in junior positions such as axeman, rodman and chainman. Approximately 75 trainees attend this course annually.

Highway Construction Inspectors

The Banff course was supplemented last year by a special one-week course for highway construction inspectors. Thirty inspectors were in attendance.

DEPARTMENT OF JUSTICE,
VOCATIONAL TRAINING IN CANADIAN PENITENTIARIES

Introduction

Educational classes for inmates with little or no schooling, and unorganized on-the-job training for inmates employed on maintenance crews or in workshops and power plants, have long been available in Canadian penitentiaries. It was not until twelve years ago, however, that organized full-time vocational courses were provided for inmates of any federal penitentiary.

The present system of full-time courses had its origin in the recommendations of the Archambault Royal Commission which reported in 1938. One of its many recommendations was that the existing educational and training programs be extended and that full-time vocational instruction be provided as part of an over-all rehabilitation program.

At a conference of Chief Trade Instructors in 1945, it was agreed that separate buildings should be supplied for such instructional purposes. In 1947, full-time vocational courses were established in special shops at Collin's Bay Penitentiary near Kingston and, in the same year, similar classes were organized in the workshops of St. Vincent de Paul Penitentiary at Montreal. These full-time vocational programs have now been established in six of the eight federal penitentiaries.

A penal or correctional institution is a small city which must provide light, heat, water, sewage disposal, housing, furnishings, clothing, food production and preparation, educational and recreational facilities, communications, transportation and other services for its inmates or residents. While some of these services must be supplied by outside agencies and skilled staff workers, it is natural and proper that inmates of penitentiaries should be required to provide as many as convenient from their own ranks.

Prior to the inauguration of organized vocational training, inmates were frequently assigned to such duties and jobs without much regard for individual preferences or abilities. It was more a result of chance than of planning if the work performed by such inmates was of direct benefit on their return to civilian life. Furthermore, an inmate might have been employed in a suitable field or industrial occupation but the natural tendency to keep him at familiar, relatively simple tasks reduced his chances of gaining all-round skills and becoming qualified for civilian employment in such field.

To overcome this loss of potential skills and to facilitate the rehabilitation of such persons, an organized system of training-on-the-job, known as "control training", was introduced into Canadian penitentiaries shortly after the inauguration of full-time vocational courses. This

system, which provides for all-round training through a planned supervised rotation of jobs, is slowly replacing the old method of acquiring skills and experience through the pick-up or rule-of-thumb method of learning.

Purpose and Scope of Training

The ultimate purpose or aim of all training programs in Canadian penitentiaries is to assist in the mental, social, and economic rehabilitation of the trainees. Therefore, in any so-called vocational program the stimulation of interest in future welfare and the development of special aptitudes, sound social attitudes and good work habits are of equal or, in some cases, greater importance than the mere acquisition of knowledge and occupational skills.

It should be borne in mind, however, that the scope of this study is restricted to those programs that are specifically designed to prepare trainees for employment in skilled, non-professional occupations. For that reason no mention is made of the various recreational and social programs that are important parts of the over-all rehabilitation plan for vocational trainees. Similarly, references to the organized system of classroom academic training are included only to indicate the relationship of such instruction to the vocational training programs.

The primary objective of full-time vocational courses in penitentiaries is to provide broad basic training which will enable the trainees to obtain self-supporting employment in skilled occupations on release from penitentiary.

It is realized that relatively few trainees will remain in penitentiary long enough to qualify as competent tradesmen. Therefore, the programs have been organized along the lines of the provincial apprenticeship programs so that graduates and trainees released prior to graduation may complete their training in accordance with the requirements of existing practices and regulations in the various provinces.

The objective of the programs of organized training-on-the-job, designated as "control training", is to provide all-round training by regulated periodic transfers to new types of work within the trade or occupation. For various reasons, this is not always feasible. The scope and effectiveness of such training varies considerably depending on the nature of the operations performed in the workshop. Progress has been slow but the program is now being operated in five penitentiaries.

If trainees are to receive full benefit from these training programs, it is important that the apprenticeship and educational authorities of the provinces as well as the representatives of unions and employers co-operate with the penitentiaries. Fortunately, such co-operation has been forthcoming and it is greatly appreciated by officials of the Department of Justice.

Until about ten years ago the sole function of classroom academic instruction in Canadian penitentiaries was to provide elementary school instruction to illiterates and inmates with very low school standing. This is still the primary function of the penitentiary schoolteacher but, for a number of years, provision has been made for assisting any inmate to complete his elementary school standing, at public expense, and for tutorial assistance to those inmates who enrol, at their own expense, in approved correspondence courses, either academic or vocational.

The need for further expanding and extending the services of penitentiary schoolteachers became apparent with the establishment of full-time vocational courses in 1947. In order to secure the co-operation of provincial authorities, it was necessary to ensure that penitentiary trainees in designated apprenticeship trades comply with regulations governing entrance requirements and certification.

Since some otherwise suitable trainees lacked the required academic standing for apprenticeship training it became necessary to provide supplementary or related academic training for them.

The periods of incarceration for most inmates were too short to include complete courses in academic classrooms in addition to full-time trade courses. Special co-operative arrangements were needed, if these inmates were to receive adequate trade training prior to release.

Steps are being taken on an experimental basis to solve this problem. One method is to provide short intensive full-time academic courses preceding trade training. The other approach is to combine the two phases of training by providing intensive instruction in essential academic subjects along with the trade training. Under the latter method, individual academic deficiencies are determined and special training provided, in small groups, to fit the requirements of each trainee.

It is expected that these experiments will result in close co-operative action, if not in some form of co-ordination or amalgamation of the academic and vocational training programs.

Organization and Administration

The administrative control of educational and vocational training programs in Canadian penitentiaries is the responsibility of two separate divisions or branches of the office of the Commissioner of Penitentiaries.

A Deputy Commissioner is responsible for the administration of training programs for personnel of penitentiaries as well as academic classroom instruction for inmates and the operation of penitentiary libraries. In each penitentiary the schoolteacher is responsible to the Warden for the organization and operation of academic classes and the library. He may be assisted by one or more assistant schoolteachers and librarians who may function in either or both capacities.

The administration of all vocational and trade training programs in penitentiaries is the responsibility of the Assistant Commissioner for Industries and Vocational Training who also represents the Commissioner in the administration of workshops and production activities in the workshops. He is assisted in the development and management of training activities by the Co-ordinator of Vocational Training.

In each penitentiary the full-time vocational courses, which are usually conducted in buildings erected for the purpose, are under the control of the Chief Vocational Officer. He is assisted by vocational instructors, usually at least one for each trade course. In some cases, special instructors are employed to teach related subjects such as mathematics, bluepring reading, draughting, science, and language.

Training-on-the-job in workshops and on maintenance crews is the direct responsibility of the chief trade instructor who is also responsible for production and other workshop activities. The training of stationary engineers in penitentiary power plants is under the supervision of the chief plant engineer. These officers co-operate with the chief Vocational Officer (CVO) in determining course content. All statistical reports are submitted to Ottawa through the CVO.

On-the-job supervision and instruction are provided by trade instructors, who are also responsible for production and work programs in each shop or trade.

Inmates of St. Vincent de Paul Penitentiary in Montreal who are approved for full-time vocational training are transferred to the nearby Federal Training Centre which is a special institution for young inmates. Similarly, prospective full-time trainees in Kingston Penitentiary are transferred to nearby Collin's Bay Penitentiary which is specially organized for the requirements of young offenders.

Types of Vocational Training Programs

As indicated above, there are two types of organized vocational training programs in penitentiaries. They are designated as "full-time vocational training" and "control training".

Full-time Vocational Training: Full-time vocational courses are usually of nine to twelve months duration including full-time attendance in courses for specific trades followed by training-on-the-job, sometimes under the supervision of the same vocational instructors. Graduates may then gain additional trade experience through regular employment on a maintenance crew or in a workshop.

The full-time school day is not uniform in all penitentiaries. It varies from five to seven-and-one-quarter hours. Classes operate for five days per week. Homework is performed in the cells after class hours and during week-ends.

The variety and duration of full-time courses in each penitentiary are indicated below:

Table 13

Full-time Penitentiary Courses

Course	Duration of Courses at Each Institution					
	N.B. Dorchester (Mths.)	Que. Fed.Tr.Centre (Mths.)	Ont. Collin's Bay (Mths.)	Man. (Mths.)	Sask. (Mths.)	B.C. (Mths.)
Automotive Mech.		9	9 + 3	10		10
Auto Body Repairs		9				
Bricklaying	9 + 3	9	9 + 3	9 + 3		
Cabinet Making		12				
Carpentry	9 + 3	9	9 + 3		10	10
Commercial						10wks.
Diesel						10
Draughting						44wks.
Electrical		10	9 + 3			
Machine Shop		11	9 + 3			
Painting and Decorating					10	
Plastering		10				
Plumbing	9	11	9 + 3		10	
Sheet Metal		9	9 + 3			10
Upholstery	9					
Welding		various				
Rural Repairs					10	
General Shop		various				
Basic Metal Trade		3 wks.				

NOTE: Where possible, graduates pending release go to the shop or maintenance crew of their trade for additional training and experience under another instructor. Courses marked "9 + 3" consist of 9 mos. school or class instruction followed by 3 mos. of practical training in shop, under the same instructor.

Statistical data regarding enrolments, drop-outs and graduates are given in the three tables at the end of this section of the report. The following figures, extracted from these tables, indicate the extent and value of the full-time program.

In the month of October 1958 there were 411 full-time vocational trainees enrolled in 41 classes covering 15 trade courses. Of the 3,318 inmates enrolled during the past twelve years, 2,749 have been released. Of these, 1,522 were graduated, 353 were released before completion but ready for trade employment, and 874 either dropped out or were dismissed for cause. Of the 1,522 graduates, only 433 or about 28 per cent have any record of criminal offense following release. Of the 353 released prior to graduation only 26 per cent are recidivists. This better record is probably due to the majority being released on ticket of leave, as good risks. These figures are less than half of the normal percentage. The improvement cannot, of course, be attributed wholly to vocational training or to any other single form of training or remedial activity.

The thoroughness of practical and theoretical instruction provided by the various full-time courses is indicated by the following outline setting forth the course content and related instruction given in the machine shop practice course at Collin's Bay.

Course in Machine Shop Practice, Collin's Bay

A. Practical Training (12 months=1,250 hours)

Practical training shall be given in the following operations and work projects during the trainee's first 12 months in the machine shop. These units are to be taught in the shop through the use of especially devised training projects and some institutional maintenance work.

Bench Work and Fitting

Fundamental use of hand tools	Tapping
Laying out	Sawing (hand)
Filing	Chipping
Drill grinding	Babbiting bearings
Drilling	Fitting bearings
	Scraping flat and curved surfaces

Drill Press

Layout	Reaming
Drilling and drill grinding	Countersinking
Tapping	Counterboring

Shaper Work

Shaper tool grinding	Dovetail
Plain rough flat	Parting off
Plain finish flat	Keyway cutting-external
Plain vertical	Keyway cutting-internal
Plain angular	Form shaping
Step shaping	Grinding on a shaper

Engine Lathe

The following units will be applied to chucking work, work turned centres, face plate, and fixture work.

Centreing stock	Parting off
Rough turning	Facing
Finish turning	Drilling
Step turning	Reaming
Recessing	Boring
Turning to a shoulder	Tapping
Taper turning	Counterboring
Radii turning	Lapping
External threading	Grinding in the lathe
Internal threading	Centre grinding
Knurling	Use of the turret lathe

Milling Machine

Plain rough	T slotting
Plain finish	Fly cutting
Milling to a stop	Form cutting
Angular milling	Keyway cutting
Gang milling	Gear cutting
Recessing	End milling
Slitting	Helical milling

Surface Grinder

Flat, dry	Angular grinding
Flat, wet	Form grinding
	Fixture set up

Tool and Cutter Grinder

Plain cutter grinder	Form tooth cutter grinder
Helical cutter grinding	Small cylindrical grinding
Staggered tooth cutter grinding	Reamer grinding

Cylindrical Grinder

Plain grinding
Taper grinding

Grinding to a shoulder
Fixture set up

Heat Treating

Metallurgy
Hardening
Drawing to a temper

Case hardening
Rockwell hardening

Welding and Oxy-acetylene

Welding steel
Welding cast iron
Brazing steel
Brazing cast iron

Brazing brass
Brazing bronze
Silver soldering
Sil Fos soldering

B. Theoretical (180 hours)

Theoretical instruction shall be given on all phases of machine shop work during the trainee's first 12 months in the machine shop. These units or lessons shall be taught by the Head Machine Shop Instructor in the central lecture and demonstration classroom adjoining the machine shop. This theoretical instruction shall be taught in the form of 150 lessons. These theoretical lessons shall be taught at the rate of 3 to 4 per week and shall cover the following:

Lesson

Course Units:

No.

1. Micrometers, rules, hammers, punches.
2. Marking dies, scribes, chisels, hacksaws.
3. Files.
4. Drills, countersinks, wheel dressers.
5. Lathes (8 lessons).
13. Shapers, types of shapers, parts of a standard shaper etc. (7 lessons).
20. Milling machines (5 lessons).
25. Special tools (4 lessons).
29. Grinding theory (7 lessons).
37. Math's speeds and feeds (5 lessons).
41. Lathe operations etc.
49. Threads (5 lessons).
55. Set ups.
58. Grinding (5 lessons).
63. Indexing (5 lessons).
69. Drill presses etc.
72. Bench work and fitting.
79. Mathematics, pertaining to speeds of pulley and gearing, etc.
82. Theory of testing motor output in horsepower with a dynamometer.

88. Allowances and tolerances, making coil springs.
90. Machine screws, cap screws, setscrews, bolt.
91. Principles of gearing (4 lessons).
95. Heat treatment of steels and metallurgy (3 lessons).
101. Machine shop electricity (12 lessons).
118. Oxygen and acetylene welding (9 lessons).
127. Spiral gearing.
133. Milling internal and external threads.
135. The sine bar.
138. Machine installation and erection (3 lessons).
144. Emergency repairs.
148. Machine shop house keeping.
149. Machine shop safety in general.
150. Preparation for employment.

C. Basic Arithmetic & Shop Mathematics (160 hours)

A related course in basic arithmetic and shop mathematics shall be taught to all machine shop trainees during the first 12 months of their enrolment and if possible it is very desirable that this type of instruction start before the trainee is enrolled in the machine shop course, on a pre-vocational basis. Classes shall be held during three and one half hours per week for 12 months.

Course Units

- | | |
|--|---------------------------------|
| 1. Review of Addition-
Subtraction
Multiplication
Division. | 13. Commercial arithmetic. |
| 2. Factoring | 14. Square root. |
| 3. Least common multiple, least
common denominator. | 15. Mensuration. |
| 4. Fractions. | 16. The triangle, the circle. |
| 5. Addition of fractions. | 17. Surface & volume of solids. |
| 6. Subtraction of fractions. | 18. Ratio and proportion. |
| 7. Multiplication of fractions. | 19. Equations and formulas. |
| 8. Division of fractions. | 20. Speeds and feeds. |
| 9. Decimal fractions. | 21. Gear ratio, gear trains. |
| 10. Percentage. | 22. Levers. |
| 11. Weights and measures. | 23. Horsepower, work energy. |
| 12. Unitary analysis (problems in
work, time and distance). | 24. Shop geometry. |

D. Shop Sketching Draughting & Blueprint Reading (150 hours)

A related course in shop sketching, elementary draughting and a course in blueprint reading shall be given to all the machine shop trainees during the first 12 months of their enrolment in the machine shop.

Classes will be held during three hours per week for 12 months.

Course Units

- | | |
|--|--|
| 1. Free hand sketching (simple machine shop projects to be furnished by the instructor). | 10. Orthographic projections. |
| 2. Elementary draughting practice. | 11. Complete two-or three-view drawings of simple machine parts |
| 3. Use of draughting instruments. | 12. Complete two-& three-view drawings of complicated machine parts. |
| 4. Geometrical construction. | 13. Study of symbols and abbreviations. |
| 5. Alphabet of lines. | 14. Reading of simple blueprints, estimating material quantities. |
| 6. Use and purpose of dimensions. | 15. Reading complicated blueprints, estimating material quantities. |
| 7. The scale of a drawing. | |
| 8. Visible and invisible parts on a working drawing. | |
| 9. Sections and conventions. | |

General Arrangements

To supplement lectures, lessons and other course materials, where and when possible, the following visual training aids shall be used extensively:

16MM instructional films, 35MM instructional filmstrips, opaque projection equipment, charts, diagrams, samples, photographs and trade magazines.

Written examinations shall be conducted in shop theory on a monthly basis. Written examinations shall be conducted on a bi-monthly basis in basic arithmetic, shop mathematics, drafting, and blueprint reading.

NOTE: The foregoing course content is complete, as issued by the penitentiary, except that the list of 150 lessons in theory has been shortened by including only key lessons and indicating the number of lessons under such general topics as lathes, shapers, milling machines, etc.

The extent to which control training has been provided in various occupations is indicated by the following list.

<u>Occupations</u>	<u>No. of Penitentiaries</u>
Full-time courses also provided	
Automotive Mechanics	1
Bricklaying	1
Commercial	1
Draughting	1
Electrical (electronics)	1
Machine shop	2
Sheet Metal	1
Upholstery	1
Welding	2

<u>Occupations</u>	<u>No. of Penitentiaries</u>
<u>No full-time course provided</u>	

Barbering	1
Bookbinding	1
Shoe Repairing	2
Stationary Engineering	2
Wheel Alignment	1
First Aid and Hospital	1

Other occupations in which it is hoped that organized training may become available when conditions permit include farming, gardening, poultry raising, cooking, baking, meat cutting, tailoring and certain specialized jobs in the production workshops.

The duration of the training period and the nature and extent of the classroom and tutorial instruction vary with the requirements of the job and the experience and capability of the trainee. Progress depends in large measure on the interest and effort of the individual.

The program of control training in each penitentiary has been developed on an experimental basis. While progress has been slow, the methods adopted have proved to be sound. More rapid development appears to be assured for the immediate future.

Cumulative statistical data are not available but, as shown by Table 14, 144 inmates were receiving control training during the month of October 1958, in 17 groups of trainees at four penitentiaries.

Correspondence Courses: Inmates of Canadian penitentiaries make extensive use of correspondence instruction both academic and vocational. In some courses, correspondence instruction is provided as part of the prescribed program of studies and the fees, if any, are paid by the Department of Justice.

All courses of the Canadian Legion Educational Services, which are administered by the Department of Veterans Affairs, are available to inmates and the registration fee of four dollars for non-veterans is paid by the Department. During the past ten years, 3,962 veteran and 7,978 non-veteran inmates have enrolled in these academic and vocational courses with very satisfactory results. There have been over 4,500 completions, representing about 40 per cent of the total enrolments.

Any inmate desiring to enrol in an advanced academic correspondence course may do so at his own expense, on the approval of the schoolteacher, with tutoring where needed. An inmate may also enrol, at his own expense, in any approved vocational correspondence course provided the schoolteacher and Chief Vocational Officer deem such course to be within his capability and suitable to his requirements.

Instructors - Selection and Training

Vocational instructors in full-time courses are qualified tradesmen who are selected on the basis of demonstrated ability to supervise and direct the work of others. Preference is given to applicants with teaching experience.

Trade instructors of on-the-job trainees are the foremen or supervisors of workshops and maintenance crews. They decide which of the inmates assigned to their shops will receive organized training, and control the rotation or transfer of trainees from job to job.

The qualifications for a trade instructor are set forth by the office of the Assistant Commissioner as follows:

he should be interested in teaching inmates;

he should be capable of doing the job correctly;

he should know how to correct the mistakes made by a new man in such a manner that the man will not become discouraged or have his feelings hurt;

he should be enthusiastic about the work and the shop;

he must be able to inspire the learner to keep on trying until he has mastered the task.

Most instructors require some form of teacher training and this is provided in various ways. Special four-week courses in teaching methods and techniques are conducted by the Department of Justice at its Staff Training College in Kingston. These are conducted every second year and vocational instructors may be required to attend two sessions. Advantage is taken of suitable opportunities for attending classes in "Job Instruction Units"; also in short teacher-training courses conducted by provincial Departments of Education.

Selection of Trainees

One of the requirements for success in any training program is the careful selection and supervision of trainees. This is not overlooked by penitentiary authorities and an effort is made to select only those persons who have the necessary interest and capacity to absorb and apply the available instruction.

Shortly after arrival at an institution each inmate is interviewed by the members of the Classification Board, a representative body including the Deputy Warden, who may act as chairman, the schoolteacher, Chief Vocational Officer, psychologist and medical Officer. He is counselled and directed towards the self-improvement opportunities which are available to him and is given the opportunity of seeing the educational and training facilities and choosing, within limits, the type of training in which he would like to participate.

Training for Women

Educational and vocational opportunities for women are restricted to academic classes and short courses in typing and weaving. This is due in large measure to lack of suitable facilities arising from the fact that all female inmates are committed to Kingston Penitentiary.

The problem of training for women is currently under review and it is hoped that facilities and courses may be considerably expanded in the near future.

Expected Developments

Organized vocational training programs in Canadian penitentiaries have been confined almost exclusively to construction, maintenance, light industry, and service occupations in which there has been relatively little change in skills and knowledge due to recent technological developments. The recent introduction of a course in electronics at the British Columbia Penitentiary is perhaps the only noteworthy development in the field of technology.

A special committee appointed by the Minister of Justice is now reviewing penal systems in Canada and abroad. Its purpose is to determine how best the recommendations made by the Fauteux Committee in 1958 can be implemented.

While it is too early to predict the changes which will be made, it is evident that they will directly affect the existing educational and vocational training programs described in this report.

It is the hope of officials that both full-time vocational classes and on-the-job training will be considerably expanded, in the near future, for both men and women.

Table 14.

FULL-TIME VOCATIONAL CLASSES AND CONTROL TRAINING GROUPS - ENROLMENTS FOR OCTOBER 1958

Trades or Courses	Dorchester, N.B.			Fed. Training Centre, Que.			Collins Bay, Ont.			Manitoba			Saskatchewan			British Columbia			TOTAL							
	Enrol't.	Classes	Enrol't.	Full-time	Control	Groups	Enrol't.	Classes	Enrol't.	Full-time	Control	Groups	Enrol't.	Classes	Enrol't.	Full-time	Control	Groups	Enrol't.	Classes	Enrol't.	Full-time	Control			
Automotive Mech.																										
Auto-body Repairs & Painting																										
Barbering																										
Bookbinding																										
Bricklaying																										
Cabinet Making																										
Carpentry																										
Commercial																										
Diesel																										
Draughting																										
Electric Installation																										
Electronics																										
General Shop																										
Machine Shop																										
Metal Trades (general)																										
Painting & Decorating																										
Plastering																										
Plumbing & Fitting																										
Rural Repairs																										
Sheet Metal																										
Shoe Repairing																										
Stationary Engineering																										
Upholstery																										
Welding																										
Wheel Alignment																										
First Aid																										
TOTAL	44	4	19	2	157	15	28	4	93	9	-	19	2	-	49	5	31	4	49	6	66	7	411	41	144	17

Table 15.

CUMULATIVE NUMBERS OF FULL-TIME TRAINEES, RELEASED - UP TO MARCH 31, 1958

Trades	DORCH.			F.T.C.			C.B.			MAN.			SASK.			B.C.			TOTAL				
	Graduates	Dropouts	Total	Graduates	Non-Grads.	Dropouts	Graduates	Non-Grads.	Dropouts	Graduates	Non-Grads.	Dropouts	Graduates	Non-Grads.	Dropouts	Graduates	Non-Grads.	Dropouts	Graduates	Non-Grads.	Dropouts	Total	
Automotive Mechanics				13	7	9	29	35	2	9	46					59	6	20	85	107	15	38	160
Auto-Body Repairs & Painting					1		1																
Bricklaying	53	5	35	154	31	91	276	106	19	52	177	8	-	2	10					321	55	180	556
Cabinet Making				54	42	75	171													54	42	75	171
Carpentry	68	18	57	76	19	59	154	82	17	8	107	49	3	19	71	12	7	9	28	287	64	152	503
Commercial																17	5	4	26	17	5	4	26
Diesel																3	-	2	5	3	-	2	5
Draughting								8	-	1	9					35	1	83	119	43	1	84	128
Electric																							
Installation																							
Machines				51	16	40	107	20	-	10	30									71	16	50	137
Basic Shop																							
Painting & Decorating				9	18	18	45	57	7	23	77					-	-	5	5	56	25	46	127
Plastering																							
Plumbing				47	116	26	89					71	3	24	98					71	3	24	98
Rural Repairs	75	23	35	63	18	21	102	83	10	30	123	18	2	10	30					47	16	26	89
Sheet Metal												109	9	42	160					239	53	96	388
Upholstery																							
Welding	29	3	17	7	32	17	56	58	12	17	87	109	9	42	160	3	1	4	8	109	9	42	160
																				68	45	38	151
																				29	3	17	49
TOTAL	225	49	144	474	200	356	1,030	439	67	150	656	8	-	2	10	247	17	95	359	1,522	353	874	2,749

Table 16.

FULL-TIME VOCATIONAL CLASSES - CUMULATIVE TOTALS TO MARCH 31, 1958

	DORCH.		F.T.C.		C.B.		SASK.		MAN.		B.C.		TOTAL	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
<u>Training:</u>														
Enrolled for training ...	509	100	1188	100	789	100	424	100	27	100	381	100	3318	100
Dropped from training or failed course	171	33.6	370	31.2	186	23.6	102	24.1	6	22.2	152	40.0	987	29.75
Released before graduation	49	9.6	200	16.8	67	8.5	20	4.7	NIL		20	5.2	356	10.73
Graduates	240	47.1	501	42.2	461	58.4	261	61.6	12	44.4	160	42.0	1635	49.28
Total	460	90.4	1071	90.1	714	90.5	383	90.3	18	66.6	332	87.2	2978	89.75
Remainder in training ...	49	9.6	117	9.9	75	9.5	41	9.7	9	33.3	49	12.8	340	10.25
<u>Placement:</u>														
Graduates Released	225		474		439		247		8		129		1522	
Reverted to crime of any type	57	25.3	113	23.8	139	31.7	84	34.0	NIL		40	31.0	433	28.45
Released Before Graduation	49		200		67		20		NIL		20		356	
Reverted to crime of any type	17	34.7	40	20.0	27	40.3	5	25.0	NIL		3	15.0	92	25.84

DEPARTMENT OF NATIONAL DEFENCE
TRADES AND TECHNICAL TRAINING IN THE
ROYAL CANADIAN AIR FORCE

Purpose and Scope of Training

In considering the trades and technical training requirements and programs of the Royal Canadian Air Force in their relationship to the purpose and scope of this survey, it should be borne in mind that the RCAF is a defence organization and not an educational or training institution. Consequently, all training programs are designed to meet the specific needs of a fighting force. These needs include the operation, servicing and maintenance of aircraft and other mobile equipment; armaments; mechanical, electronic and electrical equipment of various kinds as well as the provision of ancillary services in connection with housing, feeding, health, and recreation.

The necessity of maintaining a well trained, youthful force, despite the rapid turnover due to high standards and short periods of enlistment, makes it essential to operate relatively large and continuous training programs of various types. Such programs are also necessary to maintain an effective reserve or auxiliary force, and, to a lesser degree, for the training of cadets. An extensive system of basic and specialized training has been developed for the initial training and advancement of officers and airmen in all branches of the service.

Some courses are of a purely military or disciplinary nature, designed to develop physical fitness and esprit de corps. Other programs are designed to rectify the educational and language deficiencies of trainees in order that they may take advanced technical courses or officer training. Such training programs, while essential to the development of an effective air force and of great importance to the individual trainees, are not within the terms of reference of this survey.

There are, however, many programs and courses in which the trades and technical training provided for newly enlisted personnel and for the upgrading or "trade advancement" of tradesmen and technicians are directly related to civilian requirements. It is with such programs and courses that this survey is directly concerned.

The attitude of the RCAF towards such training is similar to that of a large industrial or commercial organization. In other words, basis or pre-employment trades training is deemed essential only in those trades or specialized occupations in which the supply of trained or partially trained workers from outside sources is inadequate. Nevertheless, the specialized nature and requirements of the Air Force make it necessary to provide some training for all types of RCAF trades and technical occupations regardless of the previous training and experience of enrollees.

These training programs must be sufficiently flexible to meet rapidly changing requirements in the number and distribution of trainees, the content and duration of courses, and the need for new courses and techniques. Those officers responsible for training are constantly striving to solve increasingly difficult problems arising from the use of new types of aircraft, more intricate equipment, and the rapidly changing pattern of air defence.

Organization and Administration

All training in the RCAF is divided into two main branches or types namely "air training" and "ground training". Subject to certain refinements and exceptions, these terms may be defined as follows:

"Air training" includes all types of training for pilots, navigators, radio officers and interceptors, as well as some specialized training for aero-engine technicians who become flight engineers and for other persons who fly.

"Ground training" includes all programs and courses for non-flying personnel, such as the maintenance of aircraft, the operation and maintenance of air borne and ground equipment, ground defence, survival, and ancillary personal and social services such as housing, feeding, health, and recreation.

The operation of all types of formal centralized training programs conducted by the RCAF, with one exception, is the direct responsibility of Training Command, one of the five functional divisions or commands into which the operational activities of the RCAF are divided. Training Command operates under an Air Vice Marshall with headquarters at Trenton, Ontario.

Responsibility for determining the types of training required, the numbers to be trained, and the level of skill and technical knowledge to be attained is shared by several directorates at Air Force Headquarters working in close co-operation with Training Command and the other commands directly concerned with specific programs. The chain of responsibility and the inter-relations of the units and joint committees are too involved for explanation in this report but such co-operative action should ensure that the training programs are designed to meet specific needs and changing requirements of the RCAF, as they develop.

The Air Force Headquarters officer directly responsible for the planning and control of training is the Chief of Training who holds the rank of Air Commodore. Under him are the Directorate of Ground Training, the Directorate of Air Training, and the Directorate of Training Aids. The Directorate of Training Aids co-ordinates the production, purchase and distribution of simulators, panels, charts, films and other types of visual and audio training aids.

The Defence Research Board is represented at Air Force Headquarters by a Training Adviser to the Chief of Training, whose services are available for dealing with any educational, technical, or scientific matters within the scope or jurisdiction of the Board. For example, he arranges with the Board for the development of certain prototype simulators or other training aids which require planning or redesigning for use by the RCAF. He also assists with the development of courses and training techniques and offers suggestions for improvement in existing programs and courses.

At Training Command Headquarters, the Senior Air Staff Officer is responsible for all training operations. He operates through three directorates or branches headed by the Senior Officer Air Training, the Senior Officer Ground Training, and the Senior Officer Examinations. The first two officers act in close co-operation with their counterparts at Air Force Headquarters.

The Senior Officer Examinations is responsible for maintaining standards in accordance with established policy and procedure, through the setting and grading of examination papers.

This applies to all final examinations in Training Command and others administered on a service-wide basis, including basic training, trade group ratings, annual proficiency tests for aircrew members, certain qualifying examinations for promotion in rank, and examinations for entry to staff college.

Centralized examinations are approved, marked and graded through the Central Examination Board of Training Command. Permanent units or sub-committees of the Board operate at certain training schools where the volume of work warrants such arrangement. In some cases, one of the staff colleges or a university may act for the Board and occasionally an expert in the particular subject may be used for special examinations.

The magnitude and scope of organized training in the RCAF is indicated by the fact that approximately 67,000 papers of 2,500 varieties are examined by the Board annually. These figures do not include the many initial and progress tests and examinations administered by schools and training centres.

Air Training

The training of pilots and other members of an aircrew is a long and somewhat complicated process of a highly specialized nature which, it is felt does not come within the scope of this survey.

Such training involves basic courses of from one year to eighteen months before the trainee qualifies for his wings. This is followed by several months of training on the type or types of aircraft to be flown in the command to which the trainee is posted. There are also intensive training periods of various types and duration extending over a period of several years. The qualified pilots and aircrew members must pass annual proficiency tests or examinations.

Despite wide variations in training and experience, many persons who have received air training in the RCAF have found it very useful in civilian life. Usually its direct value is limited to the flying of aircraft. The training and experience received in Transport Command is most closely related to the requirements for civilian employment.

Many pilots and other crew members of civilian air lines and governmental aircraft received most of their training in the RCAF. Almost all of the pilots of helicopters operated by the Department of Transport and the Royal Canadian Mounted Police were trained by the RCAF. Air Force pilots who qualify as Flying Instructors, after about 14 months of special training, are well qualified for such work in flying clubs or elsewhere. The few officers who are specially trained in the field of "instrument and equipment development and testing" find no difficulty in transferring to good technical positions with companies which manufacture or sell this type of equipment.

Ground Training

Trade Structure: All ground courses for tradesmen and technicians are based on a trade structure developed in co-operation with the Inter-Service Trade Structure Committee, consisting of one representative from each of the Navy, Army, Air Force, Defence Research Board, Department of Labour and Unemployment Insurance Commission.

The trade structure of the RCAF consists of approximately 80 trades which are grouped into 37 "career fields", and these are grouped under nine "occupational fields" or functions of the units comprising the non-flying operations of the RCAF.

The nine occupational fields are:

- Combat
- Information, Intelligence, and Communications
- Engineering Services
- Electrical Engineering and Maintenance
- Mechanical Engineering and Maintenance
- Transportation and Supply
- Administrative Services
- Health Services
- Personal Services

The breakdown of these "occupational fields" into "career fields" and "trades" is illustrated by the following example:

"Electrical Engineering and Maintenance" is divided into four "career fields", namely, Telecommunications (ground), Telecommunications (air), Wire Communications, and Aircraft Instrument and Electrical Maintenance.

These four "career fields" are further divided into twelve "trades", all in the general field of electrical maintenance. They are:

- Communications Technician (ground)
- Radar Technician (ground)
- Telecommunications Maintenance Superintendent (ground)
- Communications Technician (air)
- Radar Technician (air)
- Telecommunications Maintenance Superintendent (air)
- Telephone Technician
- Telegraph Technician
- Wire Communications Maintenance Superintendent
- Electrical Technician (Aero)
- Instrument Technician
- Aircraft Instrument & Electrical Maintenance Superintendent

As previously indicated, the total number of "trades" is approximately 80. In time of war or emergency this number is increased to over 90. Furthermore, at such time, enrollees in some trades receive basic training in only one of the trade specialties.

Trade Specialties: Some of the more highly skilled trades are divided into two or more types of employment to fit the special skills and requirements of operational or maintenance duties and responsibilities. For example, an aero-engine technician is required to perform all necessary operations for the maintenance of aircraft engines. Very few, if any, such persons are fully competent to maintain all types of engines and the trade has been broken down into five specialties, viz., single row, multiple row, liquid cooled, gas turbine, and jet engines. A technician receives basic training on the first four types and may later specialize through extra training and experience in two or more of these specialties. The coding system of the trade structure will indicate his basic trade, the specialty in which he is employed and other specialties or special qualifications.

Trade Groups: All skilled trades in the RCAF are divided into trade groups or levels of skill, experience and knowledge. A very few trades, such as "switchboard operator" and "driver mechanic" have only one group. Approximately ten trades have two groups and the remainder have three or four. Persons in Group 4 are usually supervisors or superintendents of two or more trades comprising the career field. Sergeants may hold the rating of Group 4 in nine of the engineering or technical trades, but in all others, Group 4 tradesmen must be flight-sergeants or warrant officers. Trades pay, as distinct from pay of rank, depends on the group rating of the individual. It is the same for all tradesmen with the same group rating.

Trade Specifications: A most important part of the over-all trade structure is a complete set of trade specifications covering all trades in the RCAF, including certain trades which are common to all three of the armed services.

These specifications, which are for official use only, serve as authoritative guides for those persons immediately responsible for personnel selection, training, trade examining, and other functions. They are based on analyses of all trades, as submitted by over 4,000 airmen from all levels of skill in representative units of the RCAF across Canada.

The trade specifications are grouped by occupational and career fields. Those for each "career field" set forth such information as the scope and organization of trades comprising the field, the classification and coding of such trades, the division of responsibilities, application of the trades to airwomen, selection of pre-entry requirements, working conditions, station duties, training procedures, progression in the career field, and related occupations in the Navy, Army, and civilian institutions.

Specifications for each group (or level) of each trade in the career field include such items as duties and tasks, training, experience, skills and knowledge required, responsibility and supervision, working conditions, method of qualification, career possibilities, and related occupations.

Trade Study Guides: While the "trade specifications" clearly outline the duties and tasks of each trade, and also the requirements of training, experience, skills, and knowledge, they do not give this information in sufficient detail to meet the needs of individual trainees, instructors or examiners in determining the subject requirements, trade operations, skills, and sources of reference material for basic and advanced courses in each trade.

A series of 68 "trade study guides" has been prepared of which about 35 are either under revision or not available.

These guides set forth, in tabulated form, the "subject requirements" (i.e. tools, test equipment, maintenance operations, servicing equipment, and inspections, as well as the specific mathematics and physics or science) for each level of each trade.

The following extracts from the study guide for instrument technicians indicates the nature and scope of the training program for the technical trades.

Subject Requirements for Instrument Technicians
Group I

Tools and Maintenance Equipment - Basic

- Hand tools
- Power tools
- Precision tools
- Electrical maintenance test equipment

Inspection, Repair, and Modification - (divided into five sections or lessons)

Operation of Instrument Test Equipment
Practices and Safety Precautions - (9 divisions)
Basic Electrical and Electronic Theory -

Batteries
Direct Current
Alternating current
Electrical synchronous systems (dc & ac)
Electronics - tubes, rectifiers, amplifiers, etc.

Physics and Mathematics - sufficient to understand operating principles of aircraft instruments
Principles of Operation and Construction of Aircraft Instruments - (4 divisions) - engine, flight, compasses, navigation
Aircraft Instrument Services
Order Systems and Maintenance Forms.

Group II

Tools and Maintenance Equipment (to ensure correct use)
Inspections
Inspection, Repair, and Modification - (4 divisions)
Operation of Instrument Test Equipment
Engineering Orders
Safety Rules and Precautions
Practices and Safety Precautions - re servicing and maintenance of aircraft - (9 divisions)
Electrical and Electronic Theory (5 divisions)
Physics and Mathematics
Principles of Operation and Construction of Aircraft Instruments and Systems - (5 divisions)
Aircraft Instrument Services
Engineering Order System and Maintenance Forms
Supply Procedure.

Group III

Tools and Maintenance Equipment - (4 divisions) - for detailed knowledge and proficiency
Aircraft Instrument Maintenance
Inspection, Repair, and Modification - (5 divisions)
Engineering Orders
Advanced Theory of Automatic Flight Controls and Navigation Instruments
Electrical and Electronic Theory - (5 divisions)
Physics and Mathematics
Principles of Operation and Construction of Aircraft Instruments and Systems - (5 divisions)
Aircraft Instrument Services - (9 divisions)
Engineering Order System and Maintenance Forms
Supply Procedure - (4 divisions)
Lubricants and Corrosion Control.

Each study guide has an appended list of coded references. The appropriate reference material is indicated clearly opposite each division and subdivision of "subject requirements".

Recruitment and Selection of Trainees

Potential tradesmen and technicians are enlisted at recruiting depots and personnel selection units, in the same manner as other recruits. They are first interviewed to determine general suitability for service in the RCAF. If approved, they complete an application form and are given a classification test to indicate mental capacity, and a mechanical aptitude test.

Those with at least Grade VIII standing who obtain the prescribed minimum scores and pass a thorough medical examination are sworn in and sent to the initial training centre at St. Johns, Quebec. Here they undergo additional tests including a repetition of the classification test, both mechanical and clerical aptitude tests, and two special tests to determine aptitude or fitness for training in the field of electronics.

After a final interview, including occupational counselling where necessary, they are assigned to the appropriate basic trade training course in one of the RCAF schools. Every effort is made to place each recruit in a suitable trade of his own choice.

Trade training does not commence until the recruit has satisfactorily completed his initial training as an airman at St. Johns.

Courses in Training Command

Ground training programs and courses operated by Training Command may be divided into four groups or classifications, namely, basic, special, supervisory, and technical officer training.

With the exception of persons who are enlisted or re-enlisted as "skilled enrollees", every person who is to be employed in a skilled or technical non-flying trade or occupation receives full-time basic training in his or her trade immediately following screening and indoctrination training.

Schools: Basic training may be received at one or perhaps two of the large RCAF schools situated at Camp Borden, Clinton and Aylmer. The school at Camp Borden provides 25 courses, mostly in the aeronautical trades, including engines, airframes, and air borne equipment such as armament and non-electric instruments. The Clinton school provides about 25 courses, mostly in the field of electronics and communications. About 25 courses, including clerical, mechanical, safety, and special courses of various types are given at Aylmer. Enrolments in these three schools at any one time vary considerably, depending on the rate of recruitment and the available openings for tradesmen in different trades.

Basic Training Courses: The scope and duration of basic training courses in trades having civilian counterparts or related occupations are indicated by the following lists.

Note: The letter "w" preceding the name of a trade indicates that it is one in which women are employed or which is designated as suitable for the employment of women. The duration of basic full-time classroom and shop training is indicated in weeks. A plus sign after the number indicates that training consists of two or more courses, sometimes at two schools. The figure under "Trade Groups" indicates the number of skill levels or groups for each trade.

Table 17.
Basic Training Courses - RCAF

<u>Technicians and Tradesmen</u>	<u>Duration</u> (weeks)	<u>Trade Groups</u>
Aero Engine Technician	26	3
Airframe Technician	26	3
Armament Systems Technician	48 +	4
Communications Technician (Air)	27 +	3
Communications Technician (Ground)	28 +	3
Electrical Technician (Aero)	31 +	3
Firefighter	18	3
Instrument Technician	32 +	3
Mobile Equipment Technician	10	3
Munitions & Weapons Technician	22	4
wPhotographer	19 or 21	4
Radar Technician (Air)	34 +	3
Radar Technician (Ground)	38 +	3
Safety Equipment Technician	23	3
Telegraph Technician	26 +	3
Telephone Technician	28 +	3
<u>Skilled Operators</u>		
Aircraft Control Operator	8	4
wFighter Control Operator	13	3
Operator Mech'l Mobile Equip't	12	3
wRadio Operator	21	3
wTeletype Operator	13	3
<u>Miscellaneous Trades</u>		
wAdmin. (Clerk typist-skilled enrollee)	6	3
wClerk Accounting	6 or 8	3
wClerk Medical	15	3
wClerk Typist	12	3
wClerk Statistics	10	3
Cook	12	4
Food Service Attendant	6	1

<u>Miscellaneous Trades cont'd</u>	<u>Duration</u> (weeks)	<u>Trade Groups</u>
wAir Force Policewoman	15	3
wMedical Assistant (skilled enrollee)	6	4
wMedical Assistant	12	4
wMeteorological Observer	10	3
wRecreation Specialist	10	4
wSupply Technician (stores)	8	3

Special Training: Special and advanced courses of various kinds are provided in the schools operated by Training Command. Some are designed to provide advanced instruction for tradesmen desiring to qualify for advancement to a higher trade group. Others are to help tradesmen acquire the special skills and knowledge required to operate or maintain new types of equipment. The following lists indicate the variety and duration of such courses.

List of Special Technical Courses

Electronics for electrical and instrument technicians (N.C.O.'s) who did not receive such training in basic courses (7 weeks).

Maintenance of electronic simulators which are used for instruction purposes (2 weeks).

Maintenance of ultra high frequency equipment (6 weeks).

Maintenance of special types of operational flight aircraft and equipment (26 weeks).

Special courses for safety equipment technicians (4 weeks).

Special courses for mobile equipment technicians (6 weeks).

List of Advanced Trade Courses

<u>Course</u>	<u>Duration</u> (weeks)
wRadar Controllers	10
wAir Force Police	4
Flight Stewards	8
wMedical Assistants	6
Cooks	12

Supervisory Training: In order to qualify as a supervisor or superintendent in any career field a non-commissioned officer (N.C.O.) must take a special supervisory course similar to the Job Relations Training provided under the supervisory training program in industry. In cases where the N.C.O.'s are required to supervise trades other than those in which they are proficient, short trade courses are provided to familiarize the prospective supervisors with the duties, responsibilities and skills of the other trades.

List of Supervisory Trade Courses

<u>Course</u>	<u>Duration</u> (weeks)
Clerk Accounting Supervisor	6
Communications Operator Supervisor	12 or 20
Cook Supervisor/Superintendent	10
Firefighter Supervisor	12
Food Service Attendant Supervisor	6
Photo Supervisor	8

Technical Officer Training: Officer training, as such, is not a matter for consideration in this study. The technical and engineering training provided by universities and the three tri-service colleges is at the professional level and therefore beyond the scope of this report. There is, however, one type of training for technical officers which is of special significance and which may be classified as advanced technical training.

It is the special training provided for small numbers of N.C.O.'s who are selected for training as technical officers. Candidates must have senior matriculation standing and a demonstrated capacity for leadership and advancement. They are sent to the school at Clinton for about five months of schooling, principally in mathematics and physics at post secondary level. They are then admitted to technical officer training courses along with graduates of university engineering courses.

The special courses provided for technical officers include aero-engines, armaments telecommunications, and mobile equipment engineering.

Courses in All Commands

As previously indicated, there is one type of formal centralized training program which is not confined to Training Command. It includes any program of specialized training which is required for the operation or maintenance of aircraft and equipment used by only one command. When such instruction is not included in basic or special training courses operated by Training Command, special courses are established by the command concerned, under what is known as "Field Technical Training Units".

The need for such field unit instruction arises from the fact that Training Command provides instruction on commonly used or representative types of operational aircraft and equipment. It is usually easier and cheaper to give highly specialized training at the place where the special aircraft or equipment is used.

For example, a graduate of a basic training course in aero-engines may be posted to a command using an aircraft equipped with a type of engine which is used only in that command. He will be given a brief course in the special skills and knowledge required for the maintenance of that engine before he is permitted to work on it.

Similarly, when any command introduces a new type of aircraft or equipment, not used by any other command, it may be necessary to send a few qualified tradesmen to the factory where it is manufactured, for instruction on its maintenance. On their return to duty, these persons will act as instructors in a course for other tradesmen in the command.

Another form of decentralized training which is planned for all tradesmen in all commands is designated as "trade advancement". In industry, this type of training or upgrading is usually called "training-on-the-job" (T.O.J.).

Such training in the RCAF is better organized than in most industrial establishments but is not regarded as formal instruction. It is the responsibility of the commanding officer at each station and is usually operated under the supervision of the station Education Officer.

Upgrading from Group 1 to Group 2 after one year's service following basic training, and from Group 2 to 3 after a further year, depends on the results of written examinations which are held every six months. A candidate may sit for examination only if recommended by his commanding officer. In some cases the recommendation depends on the results of a trade test. Prospective candidates may be released from duty two hours each week (100 hours per year), or two full weeks of 40 hours each, to attend classes. All tradesmen are also expected to take advantage of every opportunity for instruction from their supervisors and senior tradesmen.

Trade advancement instruction is spotty but an effort is made to post beginners to the larger stations or units where classes are available. Each tradesman can check his progress by referring to the trade study guide, if available.

Training Outside the RCAF

Despite the extensive and effective systems of air and ground training which have been developed within the RCAF through Training Command and Field Technical Training Units, a considerable part of the trades and technical training coming within the terms of reference of this survey is given outside the RCAF. Such training is the responsibility of the Director of Ground Training at headquarters. When the need has been established and the nature of the training determined in the same manner as for other types of training, this directorate determines where the training can best be given and co-ordinates all arrangements for its effective operation, including payment of fees and other costs. Such training is given when it is more economical to pay an outside agency than to set up an in-service training program. Usually the small numbers of trainees involved or the relatively high costs of purchasing or developing suitable training facilities and equipment is the determining factor, but occasionally outside training is required because the accommodation in courses available at RCAF training schools is insufficient to meet immediate demands.

The nature of outside training varies from short intensive courses for tradesmen and technicians to university degree-granting courses in engineering. Training may be given in the RAF, the USAF, manufacturing establishments, private and publicly operated schools, universities, or in any suitable training institution. The scope and extent of outside training is determined by the special requirements of the courses and by existing RCAF facilities at the time they are established. There is no fixed pattern or limitation.

The following examples indicate the variety of such programs:

Short courses in specialized skills similar to the training provided in Field Technical Training Units.

Self-improvement courses for airmen who voluntarily enrol in any type of course contributing directly to qualifications for advancement in the trades or career fields of such trainees. Fees up to one hundred dollars per year are repaid to the trainee on successful completion of approved studies.

A few civilians employed by the Department of National Defence for work with the RCAF are sent to service schools and elsewhere for specialized training.

Under a special arrangement with the Training Branch, Department of Labour, approximately 100 civilian teachers of academic subjects employed in training schools operated by the RCAF are hired by the appropriate provincial authorities and the salaries are reimbursed to the provinces from funds advanced by the Department of National Defence to the Department of Labour. This arrangement releases enlisted instructors for the teaching of trade and technical subjects.

Instructor Training

Most of the instructors in formal courses provided by the RCAF are N.C.O.'s and officers who are thoroughly competent in their respective trades or technical occupations and who have taken a highly concentrated course in teacher training at Training Command Headquarters.

The course is of only two weeks duration but it appears to have been very effective in teaching the instructors to prepare lesson sheets, which are required for all formal courses, and in developing proficiency in the use of various types of training aids. In fact, the results have been so good that some aircraft manufacturing firms and civilian air lines, as well as the RCMP, have paid a fee of one hundred dollars to send some of their instructors to Trenton for training.

Training Aids

An outstanding feature of school training in the RCAF is the extensive use that is made of all types of training aids. Many of the simulators used for the teaching of the operation, maintenance, and repairs of aircraft, gas turbines and jet engines, and electronic equipment of various types are too expensive and too highly specialized for adoption in publicly or privately operated trades and technical schools. Nevertheless, it appears that many such schools could profit by a study of the teaching techniques in the RCAF.

Skilled Enrollees

There is nothing to prevent the enlistment of skilled or trained personnel in any of the RCAF trades whenever available but, in general, this practice applies only to those trades in which no basic training courses are provided.

Persons enlisted as "skilled enrollees" are tested and given appropriate trade group rating on a provisional basis. They are required to qualify for confirmation of rating, by written examination, within one year, on penalty of downgrading to a lower group or dismissal from the service.

A formula has been worked out for the provisional trade grouping of previous members of the RCAF who, after varying periods of absence, re-enlist as "skilled enrollees" in their former trades.

Wide variations in the skills and technical knowledge of newly recruited tradesmen and the lack of commonly accepted nation-wide definitions and standards for most trades, make it very difficult to place such recruits in appropriate trade groups. Furthermore, the special conditions and requirements of certain RCAF trades make it necessary to provide special courses for "skilled enrollees" in certain trades. For example, many skilled sheet metal workers have had no training or experience in some essential operations of the trade as practiced in the RCAF. Similarly it has been found necessary to instruct some enlisted stationary engineers in the treatment of boiler feed-water.

Consideration is being given to the advisability of providing basic training in more trades and of devising some more effective manner of rating those "skilled enrollees" who enlist for the first time.

Relatively few tradesmen are enlisted as "skilled enrollees" in the construction trades. They are used to supervise the work of civilians employed by the RCAF or by contractors for specific jobs. They are also used for maintenance and for small construction jobs where it is not feasible or desirable to employ civilians.

Except in times of high unemployment, it is difficult to enlist competent tradesmen. Most of those now employed in a supervisory capacity are tradesmen with long service. Since there is no basic training in these trades it is difficult to develop competent workers in this field.

The extent to which "skilled enrollees" are used by the RCAF is indicated by the following list.

Note: The letter "w" preceding the name of a trade indicates that it is one that is designated as suitable for the employment of women.

Trades in which Basic Training is not Provided

<u>Technicians</u>	<u>Trade Groups</u>
wPhysio - Occupational Therapist	1 - 3
wMedical Assistant	1 - 4
wDental Technician	1 - 4
wLaboratory Assistant	1 - 3
wDraughtsman	1 - 4
wRadiographer	1 - 3
Foreman of Works	1 - 4
<u>Specialists and Support Occupations</u>	
wPublic Relations Specialist	1 - 3
wRecreation Specialist	1 - 4
wCourt Reporter	1 - 4
wGraphic Artist	1 - 4
wLibrarian	1 - 2
Clerk-Engineering	1 - 3
<u>Skilled Tradesmen</u>	
Carpenter	1 - 3
Electrician	1 - 4
Painter	1 - 2
Plumber	1 - 3
Refrigeration Technician	1 - 3
Stationary Engineer	1 - 4
Machinist	1 - 3
Metals Technician	1 - 3
wTailor	1 - 2

Training for Women

The preceding lists of courses indicate the various types of clerical and ancillary service trades in which women are employed in both regular and reserve units of the RCAF. Few women are now employed in technical trades and, with very few exceptions, it has been found inadvisable to use women in those skilled trades where the period of basic trade training exceeds 16 weeks, particularly in those which offer

long term career opportunities. While the requirements and conditions governing the training of women in any trade are the same as those for men, the current practice is to restrict the employment of women to non-technical trades.

Related Civilian Occupations

The fact that basic training and subsequent courses and examinations are based on carefully prepared trade specifications ensures a degree of uniformity or standardization far beyond that obtained through the numerous and widely differing training programs in civilian life. On the other hand, the specialized nature of RCAF trades, the system of trade grouping, and the practice of dividing some trades into specialties, particularly in time of war, make it extremely difficult to evaluate Air Force training in terms of civilian occupations. Under existing conditions, there can be no assurance that tradesmen who leave the RCAF can find suitable employment in their trades at equivalent skill levels.

There can be no doubt, however, regarding the fitness of Group 3 tradesmen and technicians for recognition as skilled workers in the same or closely related occupations in Canadian industry. In other words, a Group 3 tradesman with at least four years of training and experience in the RCAF should be as well, if not better, qualified for civilian employment in his trade or in a closely related occupation as a tradesman or mechanic transferring from one industrial establishment to another. Many former RCAF tradesmen are now occupying responsible technical positions in aircraft and other industries.

Some idea of the difficulty in correlating Air Force and civilian occupations may be gained from the following examples. These were taken from a report titled "Alphabetic Index of Civilian Occupations Related to Critical RCAF Trades", which was prepared a few years ago by the Economics and Research Branch of the Department of Labour in consultation with representatives of the Air Force.

Note: An asterisk before the civilian occupation indicates very close relationship "a.t." after civilian occupation means "air transport"; "a.m." means "aircraft manufacturing".

<u>RCAF Trade</u>	<u>Group Level</u>	<u>Civilian Occupation</u>	<u>Dictionary of Occupational Titles Code No.</u>
Aero-Engine Technician	2 and 3	Aerial Engineer (a.t.)(a.m.)	5-80.100
		Aircraft Engineer Assembler (a.t.)	5-80.130
		" Engine-Cylinder Mechanic (a.t.)	5-80.130
		" " -Dismantler (a.t.)(a.m.)	5-80.130
		* " " -Mechanic (a.t.)	5-80.130
		* " " -Mechanic Foreman (a.t.)	5-80.130

<u>RCAF Trade</u>	<u>Group Level</u>	<u>Civilian Occupation</u>	<u>Dictionary of Occupational Titles</u> Code No.
		*Aircraft Engine-Mechanic Line Service (a.t.)	5-80.130
		*Aircraft Engine-Mechanic-Overhaul (a.t.)(a.m.)	5-80.130
		Airplane Inspector (a.t.)	5-80.910
		* " Mechanic (a.t.)(a.m.)	5-80.100
		Carburetor Man (a.t.)	5-80.130
		Engine-Installation Assembler (a.m.)	5-03.572
		Engineman (a.m.)	5-80.352
		Engine Tester (a.t.)(a.m.)	5-80.350
		Final Assembly Inspector Engine Installation (a.m.)	5-03.813
		Ignition Repairman (a.t.)	5-80.130
		Power Plant Propeller Installer (a.m.)	5-03.572
		Propeller Installation Assembler (a.m.)	5-03.562
		Propeller Mechanic (a.t.)	5-80.130
		Supercharger Repairman (a.t.)(a.m.)	5-80.355
		Test Stand Set-up Mechanic (a.m.)	7-80.300
Aero-Engine Technician	1	*Aircraft-Engine Mechanic Apprentice (a.t.)	7-99.050
		*Aircraft-Engine Mechanic Helper Line Service (a.t.)	7-80.200
		*Aircraft-Engine Mechanic Helper Overhaul (a.t.)(a.m.)	7-80.220
		Airplane Mechanic Apprentice (a.t.)	7-99.051
		* " " Helper-Line Service (a.t.)	7-80.120
		Engine Installation Assembler Helper (a.m.)	9-03.01

<u>RCAF Trade</u>	<u>Group Level</u>	<u>Civilian Occupation</u>	<u>Dictionary of Occupational Titles</u> Code No.
Carpenter	2 and 3	*Carpenter (const'n)	5-25.110
		* " Finish (const'n)	5-25.150
		* " Maintenance (any ind.)	5-25.830
		" Rough (const'n)	5-25.230
		" Ship	5-25.640
		" Street Car	5-25.550
Carpenter	1	*Carpenter Apprentice (const'n) etc.	7-93.100
		" " (ship)	7-93.550
		" Helper Mtce. (const'n)	9-32.01
		Labourer-Carpentry (const'n)	9-32.01
Foreman of Works	4	Carpenter Foreman (const'n)	5-25.110

Recent Training Developments in the RCAF

The trade structure on which training programs are based was developed to meet the immediate requirements of a rapidly expanding air force under prevailing conditions during and immediately following World War II.

Recent technological developments in the fields of electronics, aeronautic missiles, rockets and atomic energy have brought about changes in military planning and operations that directly affect the training requirements and methods of the RCAF. Some of these developments are basic and it may be that they will materially alter the whole training system.

It is not the purpose of this survey to speculate on future developments but it may be helpful to mention one or two recent changes which indicate the difficulties in planning effective up-to-date programs for tradesmen and technicians.

Reference has been made to the need for specialization by aero engine technicians to keep pace with the maintenance requirements of various types of aircraft engines. The introduction of jet engines has created additional problems in this field.

The use of various types of electronic devices, controls and systems has made it necessary to give basic training in electronics to tradesmen who formerly performed only mechanical operations. For example, armament systems technicians now receive a 12 weeks course in electronics before proceeding with other basic courses. This applies in varying degree to other trades and creates overlapping.

Heretofore, training in theory for technicians in the electronics career field was given as part of basic training. It was found that beginners had difficulty in retaining this knowledge because only part of it could be applied during the first two years of employment. Such instruction was too advanced for beginners but inadequate for qualified technicians. Theory has now been divided into two parts, elementary theory for basic courses and more advanced instruction for Group 2 technicians seeking promotion to Group 3.

The difficulty of enlisting and retaining qualified tradesmen and technicians is largely due to the difference in earnings of Air Force and civilian technicians. Consideration is being given to the advisability of establishing higher, better paid groups in those trades which require high degrees of skill and technical knowledge.

Mention has been made of the difficulty in determining the level of skill and knowledge required for the provisional grading of skilled enrollees. It is hoped that the steps now being taken by the federal Department of Labour, in co-operation with provincial and industrial officials, to develop nation-wide standards for certain trades will be helpful in solving this problem.

The number of changes that have been found necessary has resulted in a re-examination of the whole trade structure. Consideration is now being given to the adoption of a new structure which will have fewer career fields but, possibly, more trades in the technical and electronics fields.

This survey was undertaken at what might be regarded as a critical point in the planning and operation of training programs in the RCAF, but there appears to be no indication that the problems arising from technological developments will be fewer or less complicated in the near future.

DEPARTMENT OF NATIONAL DEFENCE

TRADES AND TECHNICAL TRAINING IN THE CANADIAN ARMY

Purpose and Scope of Training

The purpose of trades and technical training in the Army is the same as that of the other two armed services, namely to assist in developing and maintaining an adequate supply of competent tradesmen and technicians to meet the specific needs of a defence force.

Organization and Administration

The organizational structure of the Army differs considerably from that of the RCAF and Navy with resultant differences in the organization and administration of training programs.

The RCAF operates through five functional commands organized on a nationwide basis, one of which is devoted to training. The Army also has five main divisions called commands but these are organized on a territorial basis. Each command is a complete operational unit which may perform all or part of the functions of the Army. Commands are divided into areas and camps.

The functional divisions of the Army are represented by fifteen corps, one for each function or service, viz.- armoured (RCAC), artillery (RCA), engineers (RCE), signals (RCSigs), infantry (RCIC), army service (RCASC), medical (RCAMC), dental (RCDC), ordnance (RCOC), electrical and mechanical engineering (RCEME), pay (RCAPC), postal (CPC), provost (CPro.C), intelligence (C.Int.C.), and chaplain services.

These corps do not operate as separate organizations. Each corps may be represented by units of various sizes in each area or camp of the five army commands. Each corps is also represented at Army Headquarters by a Corps Director who acts as an adviser to the Chief of the General Staff on all matters pertaining to his corps. He deals directly with the Director General of Military Training on matters affecting training.

All matters concerning training policy and the control of programs and courses are centred in Army Headquarters as one function of the Director General of Military Training. He is assisted by the Director of Military Training whose functions and activities are divided among several sections dealing with various aspects of training such as co-ordination, individual training of other ranks, officer training, examinations for officers, collective training and specialized warfare.

The administration of training policy and the approval or control of all trades and technical training programs covered by this report are centred in the Individual Training Section of the Directorate. This section, in co-operation with other sections and directorates, determines the number of tradesmen and technicians to be trained annually in each course of each school and the quotas of trainees for each command.

In each Command Headquarters there is a General Staff Officer, Grade 1 (GSO 1) who is responsible to the officer commanding the command for all general staff matters, including training. He is assisted by a GSO 2 and his staff. These officers are responsible for the allocation of course vacancies within the command and for the selection of candidates in accordance with the policy and quotas determined by Army Headquarters. Each school is, in effect, a corps unit of the area or camp in which it is located.

The Defence Research Board is represented at Army Headquarters by an adviser on training matters who acts as liaison between the Board and the officers responsible for training policy.

Basis of Training Programs

All trades and technical training for officers and enlisted personnel in the Army is based on two documents. They are the "Canadian Army Manual of Trades and Specialties" and the "Canadian Army Manual of Courses."

Canadian Army Manual of Trades and Specialties: This manual contains the conditions and specifications governing all army trades and specialties. It also serves as an authoritative guide in connection with definitions, trade grouping, certification and trade testing, conditions governing trades pay, the control of tradesmen, and the trades structure of the Army.

Appendices to the manual list all trades, specialties, and classifications of assistant instructors, specify the corps or agency responsible for training in each trade at each group level, indicate trade equivalents for certain trades, and set forth minimum physical, mental and educational requirements for entry to each trade.

A series of career charts or progression charts indicates the opportunities for advancement in the various occupational fields and the requirements for progression from Group 1 to Group 4 or senior supervisory positions.

Trade specifications set forth clearly and fully the duties and tasks of each trade, together with the minimum requirements in experience, skills and knowledge for each trade group or level. The degree of responsibility is also indicated for each trade group, and information is given regarding working conditions, method of qualifying for each group, career possibilities, and related occupations.

Since 1953 trade specifications have been prepared from "field studies" and observations conducted by specially trained personnel, rather than from information submitted in pamphlet form by representative tradesmen at each group level of each trade.

This method provides a uniform basis of assessment and tends to eliminate partiality inequalities and superfluous trades.

The manual is issued by the Directorate of Organization in the Adjutant General Branch of the Army. Trade specifications are prepared by the Job Analysis Section of this directorate. Changes in the specifications are the joint responsibility of organization and training directorates and must be approved by the Inter-Service Trade Structure Committee.

All trade courses, examinations, trade tests and recommendations for the upgrading of tradesmen must conform with the minimum requirements and conditions set forth in the manual.

Canadian Army Manual of Courses: This is a restricted publication issued by the Directorate of Military Training for the guidance and direction of all persons concerned with the organization and administration of trades and technical courses in the Army. It lists the courses to be given in each school and training centre, outlines the procedure for admission, indicates the facilities and requirements of each school, and summarized the aim, duration, scope, and entrance requirements of each course.

Trade Specifications (Instrument Technician)

The following summary of specifications for the trade of instrument technician indicates the thoroughness with which each trade has been analysed. All trade specifications follow the same pattern.

Summary - An instrument technician inspects, repairs, rebuilds, tests and adjusts optical and mechanical instruments.

Duties and Tasks - Manufactures and fits parts; refinishes by spray and hand painting, bronzing, bluing, and silvering; interprets drawings and makes sketches; cleans and replaces lenses, prisms and mirrors; inspects, repairs and rebuilds binoculars, telescopes, rangefinders, etc.; tests and adjusts instruments; uses technical manuals and other publications; instructs junior tradesmen.

Training, Experience, Skills and Knowledge Required - The degrees of knowledge and skill required to qualify for each "trade group" are determined from the reference material listed opposite each skill or knowledge requirement of each group.

Group 1. - The skills required include reading of simple drawings, care and use of tools, soldering, filing, drilling (hand and power), grinding, precision lathe turning, use of watchmaker's lathe, use of pantograph and engraving machine, refinishing, replacing spirit bubbles, and testing electric circuits in instruments.

The knowledge requirements include: safety precautions, methods of layout, identifying metals, annealing, hardening and tempering, methods of using hand and machine tools for various specified operations, calculations for specific operations, types of solvents, optical theory (reflection, refraction, etc.), function of prisms, types of lenses, focal length, coated lenses, methods of cementing and separating lenses, the uses of collimators and magnetizing apparatus, basic theory of electricity, and the methods of inspecting, repairing and adjusting various instruments.

Group 2. - Additional skills include working to close tolerances with hand and machine tools, tool sharpening; cleaning optical components; separating and recementing lenses; using collimators, auxiliary telescope, testing scales, adapters, magnetometers, etc.; inspecting, repairing, testing and adjusting clinometers, dinometers, quadrants, sights, compasses, gauges, and telescopes.

Group 3. - Further skills include using precision inspection tools, i.e. surface plates, gauge blocks, telescoping gauges, etc.; making drawings; precision filing and drilling; turning to within .001 in.; engraving on curved surfaces; separating and re-cementing prisms; adjusting lap bearings and bushings; making small coil springs; setting up and using instrument testing scales and adapters; inspecting, repairing and adjusting projectors, periscopes, telescopes and range finders.

Additional knowledge required includes advanced optical theory (reflection from curved surfaces, human eye, stereoscopic power, optical systems, etc.); principles of barometers, thermometers and anemometers; accounting procedures.

Responsibility - Group 1, under general supervision, does basic bench fitting.

Group 2, under supervision, does fitting, repairing, adjusting and refinishing certain instruments.

Group 3, under minimum supervision, does inspecting, testing, and adjusting of most optical and mechanical instruments.

Working Conditions - indicates physical conditions, stresses and occupational hazards of the trade.

Method of Qualification - Group 1, by passing a 20-week course authorized by Army Headquarters including the requirements outlined above for Group 1.

Group 2, qualified Group 1 technicians must pass a trade test based on requirements for Group 2, after certification of proficiency by commanding officer.

Group 3, Group 2 technicians must pass a course of 24 weeks authorized by Army Headquarters and including requirements for Group 3 as indicated above.

Career Possibilities - Group 3 technicians may progress to instrument artificer, Group 4.

Related Occupations - Air Force - instrument technician
Navy - None.

Reference Material - normally, the reference material listed in the manual will be used for instructional purposes but other suitable material may be substituted when necessary. Page numbers in each book, on which appropriate reference material is to be found, are given opposite each item of skill and knowledge in the specifications.

Instrument Artificer, Group 4: This is a supervisory trade requiring more skills and knowledge than instrument technician, Group 3. Only senior non-commissioned officers (N.C.O.'s) with Group 3 rating, who are approved by Army Headquarters, are selected for the qualifying course of 27 weeks which includes instruction in the following skills and related knowledge: re-placing cross wires; calculating focal lengths; turning and boring eccentrics; milling machine operations; inspection and repair of rangefinder sights, theodolites and microscopes; writing of summaries, reports and briefs; estimating labour and parts requirements; theory of optics; principles of electricity; inspection and testing and general procedures.

Recruitment and Selection of Trainees

The recruitment of potential trainees in the various trades of each corps is governed by the annual intake numbers for each trade as determined by Army Headquarters.

The Directorate of Manning advises recruiting offices of the personnel requirements by corps and trade, and allots quotas.

The selection of suitable recruits by the recruiting stations and personnel depots is based on interviews by Personnel Selection Officers and by a series of tests. These tests include the Army "M" test for general intelligence or mental fitness; a personality inventory, for emotional suitability; and, where necessary, an educational survey test to evaluate or confirm educational background. Several aptitude tests are available for special cases. All recruits receive a medical examination and are graded on the PULHEMS profile to indicate physical fitness for different types of army service and trades.

Wherever feasible, allowance is made for trade skills and experience received in civilian life or during a period of previous service. Persons who re-enlist in their previous trades are re-instated in an appropriate trade group depending on changes in the trade, and the period of absence. An effort is made to evaluate the skills and experience of new recruits and trade tests are given where needed. An enrollee who possesses a certificate of apprenticeship from the appropriate provincial authority is granted Group 1 rating without examination.

Trade training does not start until the enrollee has completed recruit training, lasting about 18 weeks. In some cases, it is postponed until "new soldier training" has been completed, which usually takes about one year. Ordinarily, training is given in the trade recommended at the time of enlistment. Placement is based on the requirements for tradesmen, the reports of the Personnel Selection Officers, and the aptitudes and preferences of the trainees.

Soldier Apprentices

For the past five years, the Army has recruited persons 16 years of age who undergo a special training program of two years duration, at the appropriate corps schools, before being posted for regular duties. These

young men, known as "soldier apprentices" must have completed Grade VIII or elementary schooling, and must have an "M" score of at least 130. They are selected as potential career soldiers.

The curriculum provides for approximately 50 per cent of the special training period in academic subjects, 25 per cent in military training and 25 per cent in trades training.

Academic instruction is available in the three fields of English, mathematics and science, up to senior matriculation level. Each apprentice is required to advance at least two grades beyond his standing at the time of enlistment. The average standing of new enrollees is Grade IX. Graduates of the apprentice training program have completed their recruit training and are given Group 1 rating in their respective trades.

Assignments are controlled by the specific needs of the Army at the time of enlistment but most of the apprentices have been assigned to trades which are directly related to civilian occupations.

Army instructors conduct military and trades training but civilian teachers are hired to give academic instruction.

French-speaking apprentices are trained at the RCOC school for the first 13 months. During this period they are taught English and complete their recruit training. They then proceed to the appropriate corps school for second year training.

Training for trade advancement follows apprentice training and is given through the regular channels and procedures.

Corps Schools

Ordinarily, all formal, or classroom, instruction in trades and technical training programs for officers and enlisted personnel of each corps is provided through courses conducted at corps schools. No such training is provided for chaplains, and all specialized or trades training for members of the Canadian Postal Corps is provided through training-on-the-job. There is one school for each of the other corps with the exception of the Royal Canadian Artillery Corps, which has two schools.

As previously indicated, these schools are located at convenient places within the areas and camps of the different commands.

The programs in each school include various types of specialized training for officers and enlisted personnel in the corps for which the school is operated. The following summary of courses in each school indicates the nature and distribution of the trades and technical training programs with which this survey is concerned.

Royal Canadian Armoured Corps School, Camp Borden, Ont.: Provides four courses of which only one is directly related to the requirements of civilian employment. It is a 12-week course in advanced driving.

Royal Canadian School of Artillery, Shilo, Man.: Provides 20 courses none of which is pertinent to this report except a six-week course for instructors of wheeled vehicle drivers and possibly the one-week refresher course for instructional staff, which is referred to under "Instructor Training".

Royal Canadian School of Artillery (Anti-aircraft): This school at Picton, Ont., offers 18 courses all of which are purely military in nature, except the courses in "basic science" for officers and for senior NCO's.

Royal Canadian School of Military Engineering: This school at Vedder Crossing, B.C., provides 44 courses of which 35 are designed to train tradesmen and technicians in occupations directly related to the requirements for employment in skilled civilian occupations.

The trades for which these courses are provided include draughtsmen, construction trades, machine tool operating, and surveying.

Royal Canadian School of Signals, Kingston, Ont.: This school provides 23 courses of which 16 are related to civilian employment, including driver mechanic, signals electrician, lineman, and telegraphic mechanic.

Royal Canadian School of Infantry, Camp Borden: Of the 13 courses given at this school only one is directly related to civilian employment, namely, advanced infantry driver.

Royal Canadian Army Service Corps School, Camp Borden: Fourteen of the 23 courses at this school come within the scope of this survey, including transport operators, cooks, butchers, and three types of clerks.

Royal Canadian Army Medical Corps School, Camp Borden: This school has 31 courses at various levels of which 15 are related to civilian occupations. Some of the courses are given in the military hospitals at Kingston and Toronto and at the Central Medical Equipment Depot in Ottawa. The related courses include those for laboratory and hygiene assistants, nursing assistants, operating room assistants, radiographers, physiotherapy aides, and occupational therapy aides.

Royal Canadian Dental Corps School, Camp Borden: Of the 14 courses provided by this school 10 have direct civilian application, including those for dental technicians, dental assistants, and dental equipment repairers.

Royal Canadian Ordnance Corps School, Montreal: This school provides 24 courses of which 10 are relevant, namely, clerks of different types, storemen, leather and textile workers, shoe makers, tailors, and drivers.

Royal Canadian Electrical and Mechanical Engineers School, Barriefield, Ont.: This school offers 39 courses, 33 of which come within the scope of this survey. They cover various occupations in the fields of electricity and electronics, armaments, transportation, engineering, and office work.

Royal Canadian Army Pay Corps School, Barriefield: Only three of the nine courses in this school are sufficiently related to civilian employment to be included in this report, namely, clerk-accounting, institute bookkeeper, and a correspondence course in bookkeeping.

Canadian Provost Corps School, Shilo, Man.: This school conducts 12 courses, of which at least three have significant civilian relationships, namely, the two courses for service policemen, the course for transport drivers and possibly the course in unarmed combat.

Canadian School of Military Intelligence, Camp Borden: Of the 14 courses provided at this corps school none is included in this report although some of the training would undoubtedly be of value to civilians in certain occupations.

Army Survey Establishment, Ottawa: All of the 20 courses conducted by this special school are in trades directly related to civilian occupations, including topographical surveyors, draughtsmen, cartographers, lithographers, and photographers.

Canadian Army Physical Training Wing, Camp Borden: A special school for the training of officers and NCO's as physical training instructors. It provides four courses none of which is covered by this report.

Canadian Army Methods of Instruction Wing, Camp Borden: This school provides special training for officers and NCO's who are employed in training. There are two courses, one on organization and supervision and the other on methods of instruction. These courses are referred to under the heading, "Instructor Training".

The Canadian Army Training School, Camp Valcartier, Que.: This is a special language school for the teaching of French to English-speaking students and English to French-speaking students, for the purpose of developing bilingual instructors.

Canadian Joint Air Training Centre, Rivers, Man.: This joint services school provides specialized instruction in connection with land/air warfare.

Joint Atomic, Biological, and Chemical Defensive Warfare School, Camp Borden: A specialized joint services school for officers and NCO's.

Fort Churchill, Manitoba: Another joint services training centre for specialized training in northern operations.

Canadian Vocational Training Schools: Special classes for enlisted personnel are conducted, at federal government expense, by provincial education authorities as provided by the Vocational Training Agreement under the Vocational Training Co-ordination Act. They are referred to in Report No. 5 of this series, which deals with publicly operated schools of the Canadian provinces and municipalities. Courses are prescribed and controlled by the Army. They include vehicle mechanic-wheeled at Three Rivers and Calgary, and initial electronics at Winnipeg.

Other Schools: Other schools for the training of army officers which are not directly concerned with trades and technical training include: the tri-service schools for potential officers at Kingston, Esquimalt and St. Jean; the Staff College; the Canadian Senior Officers' School, and Army Summer Courses at Kingston. The last named school provides academic courses at senior matriculation level.

Trades and Technical Courses

The nature, extent and skill levels of trades and technical courses provided in the various corps schools of the Army are indicated in Table 18.

The letter "w" before a trade indicates that women may be trained for such trade of the regular army in the event of mobilization.

The second column indicates the corps school in which the training for each trade is given.

The course duration in weeks is indicated by the figure under the trade group for which the course qualifies trainees, i.e., the 13 week course for "armourer" qualifies for Group 1 of the trade, the 15 week course, which is taken by Group 2 armourers qualifies for Group 3.

A dash (-) under a group level for any trade indicates that there is no formal course for entry to such level, promotion being made on demonstrated ability to perform the specified tasks, and a trade test. A blank space indicates that there is no such level in the designated trade. A question mark indicates no specified period of training.

If no figure is given for any trade under "duration etc.", it means that there are no formal courses in such trade.

Under "Trade Entry Requirements" are given the minimum score on the "M" test and the completed school grade required as a minimum for admission to the trade.

Table 18
Trade and Technical Courses - Army

Trade	Trained by	Duration of Courses at Different Trade Group Levels							Comments
		Entry Re-quirements							
		M	G	1	2	3	4	Total	
(weeks)									
Armament Artificer	RCEME	150	X				29	57	for Sgt. armourer 3
Armourer	"	130	VIII	13	-	15		28	
Baker	RCASC	130	VII		-	-			
wBandsman	Any Corps	130	VIII	-	-	-			
Blacksmith	RCE	130	VIII	-	-	-			

Body Repairman	RCEME	115	VII	-	-	-			
Butcher	RCASC	130	VII	6	-	-		6	
Carpenter	RCE	130	VIII	24	-	12		36	
w Cartographer	RCE	150	X	21	?	?	?	?	4 courses
w Clerk, Accounting	RCAMC	130	VIII		6	-		6	
w "	RCOC	140	X	7	-	-		7	
w Admin.	RCASC	130	VIII	7	-	4		11	
w "	"	130	IX	12	-	8		20	
w Stenographer	"	130	X		-	-			
Communications Systems Artificer	RCEME	150	X				-		
Communications Systems Artificer Technician	"	150	X	-	16	-		16	
w Cook	RCASC	130	VIII	16	-	12	8	36	
w Court Reporter	"	150	X				-		
w Dental Assistant	RCDC	130	X	4	-		4		separate courses for men & women
Dental Equipment Repairer	"	140	X	12	12	24		48	
w Dental Technician Clinical	"	150	X			24	4	28	for Sgt. dent.asst.2
w Dental Tech'n, Laboratory	"	140	X	20	-	6	-	26	
w Draughtsman, Arch'l & Engr'g	RCE	150	XII	24	-	30	12	66	
w Elec'l & Mech'l	RCEME	150	XII	-	-	-	-		
Graphic Arts	RCE	140	X	-	-	-	-	?	by outside agency
w Signals	RCSigs.	150	X	-	-				
Topographical	RCE	150	XII	24	-			24	
w Driver Mech'l Transport	5 Corps	130	VIII	-	4			4	CVT & corps schools
Electrical Artificer	RCEME	150	X				31	75	for Sgt. elec.mech.3
" Mechanic	"	130	X	24	-	20		44	
Electrician	RCE	130	X	24	-	24		48	
Electrician	RCSigs	130	X		16	-		16	

w Engineer Accountant	RCE	140	X	12	-	12	24	
Fire Fighter	"	115	VIII	6	-	8	14	
Foreman, of Works	"	150	XII		24	12	36	
Construction	"	150	XIII			-		
Gun Mechanic	RCEME				7			trade course - version 1
Gun Mechanic	RCEME	130	VIII	15	-	21	36	
Hygiene Assistant	RCAMC	130	VIII	8	-	7	15	
w Institute Bookkeeper	RCAPC	150	X	8	-	-	8	
Instrument Artificer	RCEME	150	X			27	?	2 types
w Instrument Technician	"	150	X	20	-	24	44	
w Laboratory Ass't	RCAMC	140	IX	20	-	-	10	30
Leather - Textile Worker	RCOC	90	VIII	14	-		14	
Lineman	RCSigs	135	X	16	-		16	
Line Mechanic	"			26	-	26	52	
Lithographer	RCE	130	VIII	24	?	?	?	4 courses
Machinist, Fitter	RCEME	130	VIII	17	9	18	44	
Wood	"	130	VIII	-	-			
Mason	RCE	130	VIII	24	-	12	36	
Mechanic	RCE	130	VIII		24	24	48	
Mechanist, Electrical	RCE	140	X			24		
Machinery	RCE	140	X			24		
w Medical Asst.	RCAMC	130	VIII	10	-	6	16	
w Meteorological Asst.	RCA	130	X	-	-	-	-	
w Nursing Asst.	RCAMC			3				for Gr. 1 med.asst.
w Occupational Therapy Aide	RCAMC	140	IX		10		10	
w Operating Room Ass't	"	140	IX			16	-	16
w Operator Punched Card Mech.	AHQ	140	IX	-	-	-		
Operator Engineering Equipt.	RCE	130	VIII	-	36	-	36	
Painter	RCE	130	VIII	24	-		24	
Pattern Maker	RCEME	130	VIII	-	-	-		

w Pay Clerk	RCAPC		X	8	-	-		8	
w Pharmacist	RCAMC	160	?				-		
w Photographer,	RCE	130	VIII	-	-	-	-		
Cartographic	"	150	X	24	?	?	?	?	4 courses
w Cinematographic	"	130	VIII	-	-	-			
w Photogrammetrist		150	X		?	?	?	?	3 courses
w Physio Therapy Aide	RCAMC	140	VIII	10					
w Physio-Occup'l Therapy Aide	"	140	VIII			-			
Plumber		130	VIII	24	-	14		38	
Radar Artificer	RCEME	150	X				38	79	for Sgt. radar tech.3 etc.
Radar Technician	"	150	X	13	-	28		41	
w Radiographer	RCAMC	140	VIII	12	-	5	-	17	
Radio Artificer	RCEME	150	X				38	90	
Radio Mechanic	RCSigs			8					preparatory
w Radio Mechanic	RCSigs	150	X	26	-	26		60	
Radio Technician	RCEME	150	X	16	-	28		52	
w Service Policeman	C of C	130	VIII	-	10			?	
Sheet Metal Worker	RCEME	130	VIII	24	-	12		36	
Shoemaker	RCOC	115	VIII		14	-		14	
Shoe Repairer	"	90	VI	14				14	
Small Arms Artificer	RCEME	150	X				24	52	for Sgt. armourer 3
Storeman	3 Corps	130	VIII	9	-	-		9	
Storeman	RCAMC	130	VIII	12	-	3		15	
Structural Steel Worker	RCE	115	VIII	-	-				
Surveyor, Engineering	RCE			?	-	-	?	?	2 courses
Topographical	RCE			?	?	?	?	?	4 courses
Radar	RCA		XII					5	special course
Tailor	RCOC	115	VI	14	-	-		14	
Technical Asst.			X						various types

Telegraph Mechanic	RCSigs	140	X	26	-	16	42	
Tire Repairman	RCEME	115	VIII	-	-	-		
Toolmaker	"	130	VIII	-	-	-		
Typewriter Mechanic	"	115	VIII	-	-	-		
Vehicle Artificer Mechanic	"	150	X				25	58 for Sgt. veh'1 veh'1 mech.3
Teacher							17	trade con- version
Vehicle Mechanic,	"	130	VIII	16	-	17	33	
Wheeled	"	130	VIII	16	-	-		given at CVT schools
Watchmaker	"			-	-	-		
Welder	"	115	VIII	12	-	12	24	
Welder	RCE	115	VIII	24	-	14	38	

Special Courses

Academic Preparatory	RCEME						6	where necessary
Engineering Equipment	"						6	for NCO's veh.mech.3
Institute Bookkeeping	RCAPC	(Home study correspondence course)						
Initial Electronics	RCEME						24	at CVT schools
Office Management	RCASC						4	for clerk adm. 3
Hospital Cooking	RCASC						7	specialty
Kitchen Management	RCASC						4	for NCO cooks

The relative degrees of skill, knowledge and responsibility for each trade are indicated by the top group level, the number and duration of courses and the entry requirements. This does not mean that those trades for which no courses are provided are necessarily in a lower category of skill and knowledge. In most cases, the absence of courses indicates either that the small number of potential trainees does not warrant the establishment of classes or that effective training can be provided on the job. In some trades it is relatively easy to enlist persons with previous training and experience and to upgrade them by training-on-the-job.

Trade Advancement

The number of groups in a trade varies from one to four depending on the degree of skill and responsibility involved.

Advancement from one trade group to the next depends upon the fitness of the individual for upgrading, as evidenced by satisfactory service.

There is no prescribed period of service between such trade advancements but, ordinarily, the period is at least one year. Trades pay increases with group rating and is the same for all trades.

It will be noted that most trades are divided into three groups or levels. A trade in which all persons are classified as Group 1 may be regarded as semi-skilled. One in which all tradesmen are at Group 4 level is restricted to senior N.C.O.'s acting as supervisors in highly skilled technical trades.

In a few trades, all progression depends on the successful completion of prescribed courses. The general practice, however, is to provide a qualifying course for Group 1, a trade test for entry to Group 2, and an additional course to qualify for Group 3. A further course is required for Group 4 if the trade has a fourth group, or if the trade leads to a Group 4 rating under some other designation such as artificer or assistant instructor.

Trade Tests: Advancement in the 24 trades for which no formal classroom instruction is provided depends on recommendation and the passing of a trade test. All candidates who seek trade advancement on the basis of a trade test must first be certified proficient by the commanding officer as prescribed in the manual.

Trade tests are usually prepared by experts in the appropriate corps. They must be approved by the Directorate of Military Training which also controls their distribution and use.

Tests are administered by Trade Test Boards consisting of at least two officers and one technical assessor. Regulations provide for the establishment of a trade test board in each command headquarters, each area headquarters, each corps school, and at Army Headquarters. Additional trade test boards may be authorized for certain permanent camps or stations and for troops serving outside Canada.

Tests are used not only for trade advancement from group to group but also for:

- Assessing qualifications claimed by potential tradesmen in the Army;
- Assessing qualifications of candidates completing specially authorized courses conducted by army units;
- Assessing qualifications acquired through previous service or civilian employment.

Training-on-the-Job: The Army stresses the importance of supervised on-the-job training. As previously indicated, it is a primary function of all senior and supervisory tradesmen to instruct juniors in the skills and knowledge requirements of each trade. The trade specifications are of great value in this connection and each tradesman is expected to take full advantage of every opportunity to improve his skill and technical knowledge.

The Army tries to avoid linking trade grouping to rank but this is not practicable at the higher group levels particularly where the duties involve the supervision of a group of tradesmen. Advancement from Group 1 to 2 may be very rapid, due to previous training and experience, but it usually requires at least eight years of service to attain Group 4 rating.

Training Outside the Army: Reference has been made to trade and technical courses operated for the Army, through the federal Department of Labour, under agreements with the provincial education authorities.

Army Headquarters also authorizes certain types of training to be given by other outside agencies when existing accommodation at corps schools is inadequate or where additional special courses are required which can best be given by an outside agency. Such training may be given, on a fee paying basis, in publicly or privately operated schools or by any suitable agency such as the United States Army or an industrial establishment.

Provision is also made for paying the fees of individual soldiers enrolled in approved, full-time, part-time or correspondence courses which are not available from the Army and which lead to trade qualification in an authorized trade.

Training for Women

Except in time of war or national emergency, women are not employed in trades and technical occupations of the Regular Army. Table 18 indicates the trades which are deemed suitable for women in the event of mobilization. Women are presently employed in some of these trades in the Militia, chiefly in the clerical occupations.

Instructor Training

Many of the instructors of academic subjects in corps schools are civilians. They are qualified teachers in the provinces where they serve. They are hired by the provincial education authorities or by representative boards and are paid from funds provided by the Department of National Defence.

Practically all of the trades instructors and supervisors are officers and NCO's who have received special training in methods of instruction, either during their regular training periods, or in courses for assistant instructors, or in the special school for instructors and supervisors.

This special school, known as the "Canadian Army Methods of Instruction Wing", is operated at Camp Borden. A basic course in "methods of instruction", which lasts for three weeks, is provided for N.C.O.'s and officers employed as instructors. It covers such subjects as the principles, media, preparation, presentation, and assessment of instruction; mutual instruction; playlets; use of training aids; testing; question techniques, and the psychology of learning.

An intensive nine-day course is provided for the training of officers and warrant officers. It covers organization of training programs and supervision and improvement of instruction and includes such subjects as principles of instruction, progressive training, supervision of training, use of projection apparatus and other training aids, testing, preparation of training programs, methods of instruction, grading, and assessment. Trainees must be employed in training and be familiar with the pamphlets "Principles and Practice of Good Instruction" and "Successful Instruction".

The school (or wing) also provides a field service for all schools and training units of the Army. A team of specially qualified persons visits the schools and units to assist commanders and training staffs in improving the methods and techniques of instruction at all levels.

Training Aids

The Army, like the Air Force and Navy, makes extensive use of training aids, particularly in the field of motion pictures and film strips. The Joint Services Training Film Bureau circulates both general and highly specialized material to meet the needs of the three services in this field. Use is also made of various types of aids prepared by the armed forces of the United States as well as suitable material from industrial organizations and private firms which specialize in this field. The schools also prepare their own sectionalized parts, models, and charts to demonstrate complicated mechanical operations or electrical circuits, when such material is not readily available from other sources.

Related Civilian Occupations

As previously indicated, it is difficult to determine the appropriate group ratings of trained persons entering the Army. On the other hand, it is sometimes more difficult to determine the trade equivalents and civilian qualifications of tradesmen and technicians who leave the Army for employment in Canadian industry.

In some trades, such as stenographer, cook, and maintenance electrician, it is fairly simple to equate the skills and experience gained during Army service with the requirements of the same or related civilian occupations. In a few trades, however, particularly in the fields of electronics and specialized mechanical trades of a technical nature, there are no equivalent or closely related occupations in civilian life. In such cases, the relationship between the skills and knowledge acquired in the Army and those required for civilian employment can best be determined by personal interviews based on full knowledge of the acquired skills and experience as well as the requirements of the job under consideration.

The fact that competent tradesmen and technicians in civilian life must first be trained as soldiers and then given specialized courses and/or training-on-the-job before becoming effective tradesmen in the Army indicates basic differences even in trades having the same names. Nevertheless, it is evident that in most of the trades listed in this report persons with Group 3 or higher rating have as good, if not better, training and experience as their skilled counterparts in civilian life.

Tradesmen and technicians from the Army usually have little difficulty in entering and making satisfactory progress in suitable civilian employment. There is no available information on which to base an estimate of the number of skilled workers in each trade who have received their training in the Army but it is evident that the Army, like the Air Force, has played an important part in developing the pool of skilled manpower particularly in the automotive, clerical, communication, electrical, electronics, mechanical, and scientific fields of employment. This does not imply that the Army has relieved industry of the necessity of providing adequate trades training for its employees but it does indicate that industry has relied to a considerable extent, and perhaps more extensively than is generally realized, on this source of supply for skilled tradesmen and technicians.

Developments Affecting Training

The use by the Army of various types of aircraft for transportation purposes has imposed the need for new and modified courses and training procedures. This also applies to the development and use of guided missiles and other electronically controlled or operated equipment.

The recently inaugurated program for the training of "soldier apprentices", with its emphasis on academic education and basic training, indicates a trend that might lead to further changes in policy and procedures, due primarily to technological developments.

Those officers responsible for the development and operation of training programs are fully aware of the need for such changes and welcome any action by public and private educational institutions which will result in the better preparation of young Canadians to enter skilled technical occupations.

DEPARTMENT OF NATIONAL DEFENCE
TRADES AND TECHNICAL TRAINING IN THE
ROYAL CANADIAN NAVY

Recent Developments Affecting Training

Prior to 1939 the Royal Canadian Navy was patterned on the Royal Navy and, due to the almost complete lack of an armament industry in Canada, ships were constructed in the United Kingdom. The rapid expansion of the RCN during World War II, together with new developments in technology and industrial production, made it necessary to adopt expedients and new methods which in turn have made it advisable to review the entire personnel structure.

Committee on Personnel Structure

A special committee was appointed in September 1956 with broad terms of reference, to study the problems involved and to make recommendations, on a number of specific problems including:

the methods for procurement and training of officers and men to ensure high individual standards for all and provision of an adequate number fit to assume the responsibilities of higher rank;

the qualifications for officers and men of the various types recommended;

the proposed relative responsibilities of Junior Officers and Chief and Petty Officers; etc.

This committee known, as the Ad Hoc Committee on RCN Personnel Structure, submitted its report in November 1957. In preparing its recommendations, the Committee adopted the following aims:

to keep the maximum number of ships and aircraft, manned and in highest degree of readiness, compatible with economy of money and manpower;

to provide maximum flexibility;

to make the best use of available talents;

to provide the best opportunities, at an early date, for the upgrading of deserving tradesmen;

to provide adequate, suitable career opportunities;

The report of the Committee contains 39 specific recommendations of which all but three have been approved, either fully or in principle, subject to further study and development. There are approximately 20 recommendations dealing directly with the trades structure and types of training programs coming within the scope of the manpower training survey being undertaken by the Department of Labour.

Substantial progress has been made on the implementation of these recommendations and the pattern of the new trades structure and training programs is fairly well established. It will take several years, however, to complete the plan and there are still important changes and procedures which may require modification before they are acceptable to all concerned. Changes in the trades structure and trade specifications must be approved by the Inter-Service Trades Structure Committee.

The special committee found that trade classifications and training programs in the Navy had not kept pace with the changes in skills and knowledge required for a number of trades.

Certain classifications were outmoded and persons classified as seamen were becoming labourers and unskilled operators.

There was a decreasing demand for such operators and an increasing demand for trained personnel with the types of skills required for maintenance and repairs.

The makeshift development of technical trades to meet special requirements as they developed was not economical.

There was imbalance between operators and maintenance mechanics or technicians.

The old idea of establishing personnel requirements on the operational needs of a ship in action was being replaced by a new concept based on the functional activities required for the dual purpose of maintenance and operation.

It was also found that almost as many persons were required for maintenance duties and personal services, such as feeding, medical care and recreation, as were needed for the operation of a ship in action.

Proposed Trade Structure

There are two types of personnel requirements in the Navy, namely, "ship and aircraft personnel" and "support personnel".

The functional activities of ship and aircraft personnel may be divided into four sections:

Maintenance - mechanical, electrical, seamanship, and aeronautical.

Administration - medical, stores, accounts, communications and domestic.

Leadership - officers, N.C.O.'s for discipline and supervision.

Operational - fighting and other operations.

The functions of support personnel are to provide and train staff for command, for logistic requirements and for training activities.

A new trade structure is being developed on the basis of the committee recommendations in accordance with the foregoing functional activities and a further recommendation that, where feasible, the maintenance and operations functions or duties be combined to reduce the number of tradesmen required for effective, economical operation.

The proposed structure will consist of approximately 47 trades classified under six functional groups or families of occupations having no relationship to a ship's organization. Table 19 indicates how the trades are being grouped under the six functional classifications, as well as the number of skill levels or "trade groups" in each trade or technical occupation. The figures (1 to 4) after a trade indicate that there are tradesmen at all four levels or "trade groups" in such trade. A single figure indicates that there is only one level in such trade.

Table 19

Proposed Trades Structure - Navy

<u>Tradesmen</u>	<u>Groups</u>	<u>Technicians and Senior Supervisory</u>	<u>Groups</u>
<u>Deck, Weapon, and Control Group - 9 trades</u>			
Boatswain	1 to 4		
Signalman	1 to 4		
Weaponman Surface	1 to 4		
Weaponman Underwater	1 to 4		
Sonarman	1 to 4		
Fire Controlman	1 to 4		
Radioman	1 to 4	Electronic Technician	3 & 4
Radar Plotter	1 to 4		
<u>Engineering Group - 6 trades</u>			
Engineering Mechanic	1 & 2	Engineering Technician	3 & 4
Hull Mechanic	1 & 2	Hull Technician	3 & 4
Electrician's Mate	1 & 2	Electrical Technician	3 & 4
<u>Clerical and Supply Group - 9 trades</u>			
Administrative Writer	1 to 3	Ship's Writer	4
Pay Writer	1 to 3	Ship's Storeman	4
Naval Storesman	1 to 3	Commissaryman	4
Victualling Storesman	1 to 3		
Cook	1 to 3		
Steward	1 to 3		

Medical Group - 9 trades

Medical Assistant	1 & 2	Radiographer	3
		Hygiene Assistant	3
		Laboratory Assistant	3
		Therapy Assistant	3
		Clinic Assistant	3
		Operating Room Assistant	3
		Medical Assistant	3
		Medical Technician	4

Note: Medical trades are being re-organized in the three armed services by the Inter-Service Trade Structure Committee.

Air Group - 8 trades

Air Boatswain's Mate	1 to 4	Air Technician	2, 3 and 4
Air Rigger	1	Air Electrical Technician	3 & 4
Air Fitter	1	Air Electronic Technician	3 & 4
Air Radarman	2 to 4	Air Fire Control Technician	3 & 4
Air Weaponman	1 to 4		

Miscellaneous Group - 6 trades

Bandsman	1 to 4
Photographer	1 to 4
Meteorologist's Mate	1 to 4
Physical & Recreational Instructor	2 to 4
Clearance Diver	2 to 4
Radioman (special)	1 to 4

The foregoing structure represents a considerable reduction in the number of trades and provides better opportunities for naval careers within the various classifications or groups of trades. It will be noted that the term "technician" is frequently used to designate tradesmen at Group 3 and 4 levels in any trade requiring considerable technical or scientific knowledge.

Recruitment

The requirements and procedure of recruitment have been changed to ensure better selection and to reduce losses during and on completion of the first engagement period.

The new system, as recommended, provides for:

- A training course for officers and men who do the recruiting;
- Tests of intellignece or learning ability and a simple personality test;
- Age limits to be maintained at 17 and 25 years;

A minimum educational standard of Grade VIII with at least 60 per cent of enrollees having completed Grade IX or better; The first period of engagement to be three years followed by two periods of five years, one period of seven years and a final period of five years, before pension after a total of 25 years.

Entry Training

Until recently, new recruits had been assigned to a specific branch or trade of the Navy immediately on enlistment and preceding a 15-week period of "entry training" at Cornwallis. The new procedure, as recommended by the Committee, is to enlist all new recruits as "ordinary seamen" and to provide a 15-week entry training program at Cornwallis prior to assignment.

Trade Training

A trade label is attached to each new recruit prior to completion of "entry training". The Commanding Officer of his ship may change such designation on the recommendation of the head of the department to meet a changing need for tradesmen, or because of unsuitability, or at the request of the man himself.

Formal courses to qualify for Group 1 trade rating are being replaced by training-on-the-job, which ordinarily should not take more than one year. In a few trades such as radio operator, which requires some proficiency in the Morse code and typing, preliminary courses will be necessary. Ordinary seamen will be encouraged to qualify for Group 1 as quickly as possible during prolonged periods at sea. Trade training manuals and other aids will be provided to assist in the qualifying and upgrading of tradesmen. Trainees may also take advantage of the tri-service provision for paying the fees of courses given by outside agencies and which may lead to trade advancement.

An ambitious tradesman who takes full advantage of provisions for training-on-the-job and self study may be upgraded as much as eighteen months in advance of those tradesmen who depend on formal courses organized by the Navy.

Qualifying courses are being provided, following the first period of engagement, for those tradesmen who need such instruction to qualify for Group 2 rating. Similarly, qualifying courses for Group 3 rating will be available normally in the sixth year of service. Special courses will also be provided, when necessary, to qualify tradesmen for Group 4 rating.

Trade Advancement

An effort has been made to loosen the tie between trade levels and substantive rank. An able seaman or a leading seaman may be paid up to Group 3 level and a petty officer second class may be upgraded to

Group 4. On the other hand, men cannot be advanced in substantive rank unless they hold the minimum trade group rating indicated for their new rank.

The first three years of service are regarded as the labour learning period during which a seaman must perform the common duties of a ship, including cleaning and messroom or kitchen duties, in addition to the less skilled operations of his trade. He works under instruction and learns by experience, supplemented by study during his spare time.

As previously indicated, there is no fixed rate of trade advancement and it is impossible at this time to determine an average, but it might be somewhat as follows: 1 year to qualify for Group 1 rating; 2 additional years for Group 2; 3 additional years for Group 3; 3 additional years for Group 4 - a total of nine years for advancement to Group 4 rating.

Trade Specifications

Revised trade specifications are being prepared to conform with the new trades structure and to serve as the basis of trade training and trade testing programs. These specifications follow the same general pattern as those for the other two services.

Trade Tests

A Fleet Examination Centre will be organized to establish and maintain uniform standards or qualifications for tradesmen in the Navy. It is expected that fleet trade tests and examinations will be held periodically or as required to meet the need for tradesmen at various levels in different trades.

While it is too early to describe the facilities and operations of the new trades and technical training programs it is evident that the recommendations of the Committee on Personnel Structure when finally approved and put into practice will not only simplify the trades and training structures but will provide better and more suitable training for tradesmen at all levels.

Some features or provisions of the existing system will remain unchanged except insofar as adjustments may be necessary to meet the specifications of new and revised trades.

Skilled Enrollees

It will still be possible to recruit skilled personnel and fit them into the trades structure at appropriate levels. It is expected, however, that few recruits will be enrolled under this provision.

Apprentices

The Technical Apprenticeship Training Plan which has been in operation for the past six years is being continued as an important branch or section of the over-all training system for skilled tradesmen and technicians, particularly in the engineering trades.

Under this plan a selected number of young men 16 to 19 years of age who have successfully completed Grade X schooling are enrolled twice each year as apprentices in the following trades: engineering technician, hull technician, electrical technician, air technician and weaponman.

Successful candidates are enrolled for an initial period of seven years. Each group of new apprentices is given a 15-week "new entry training" course in HMCS Cornwallis, at Digby, N.S., before being sent to Esquimalt for a 39-month trade training program in their respective trades. The course is organized as follows:

General shop training	24 months
Specialist branch training ashore	6 "
Specialist branch training afloat	6 "
Summary of training examination and testing	3 "

The following extracts from the bulletin "Technical Apprenticeship Training", which is available at recruiting centres, indicates the scope and nature of the training in each trade.

Table 20

Syllabus of Apprentice Training

First 12 months -- All Apprentices

Machine shop	25%	Foundry	2 $\frac{1}{2}$ %
Fitting shop	20%	Pattern Shop	2 $\frac{1}{2}$ %
Diesel shop	5%	Mechanical drawing .	5%
Blacksmith shop	5%	Shop Theory	10%
Welding shop	5%	Academic	10%
Sheet metal shop	5%	Miscellaneous	5%
		(study periods, etc.)	

12-24 Months -- All Apprentices Except Shipwrights

Machine shop	30%	Diesel engine shop .	10%
Fitting shop	15%	Mechanical drawing .	10%
Ship Refitting	15%	Shop Theory	10%
		Academic	10%

12-24 Months -- Shipwright Apprentices

Boatbuilding, cabinet making, ship carpentry	20%
Welding, plating, riveting, blacksmithing, sheet metal work	40%
Painting	5%
Mechanical drawing	10%
Plumbing	5%
Shop Theory	10%
Academic	10%

24-30 Months -- Engineering Artificer Apprentices

Fitting shop (steam and diesel engines)	33.3%
Ship Refitting	33.3%
Marine Engineering (classroom theory)	28.3%
Elementary Electricity	5.0%

30-36 Months -- Engineering Artificer Apprentices

Marine Engineering Afloat	100%
(operation and maintenance of marine engines and boilers)	

24-30 Months -- Shipwright Apprentices

Ship fitting, woodworking, steel working, welding,...	66.6%
Inspection and testing of ships' watertight compartments	16.6%
Drydocking and underwater repair of ships	16.6%

30-36 Months -- Shipwright Apprentices

Training afloat in ship carpentry, hull maintenance, etc.	100%
---	------

24-30 Months -- Electrical Technician Apprentices

Maintenance of ship and shore electrical power equipment, including alternating current -- high power and low power equipment; direct current -- high power and low power equipment	100%
---	------

30-36 Months -- Electrical Technician Apprentices

Training afloat in the maintenance of ship's high power and low power electrical equipment	100%
---	------

24-30 Months -- Air Artificer Apprentices

Maintenance of aircraft engines and air frames	100%
--	------

30-36 Months -- Air Artificer Apprentices

Training afloat in aircraft carriers -- Maintenance of aircraft engines and air frames	100%
---	------

24-30 Months -- Armourer Apprentices

Maintenance of ship's armament, including underwater
weapons and fire control equipment 100%

30-36 Months -- Armourer Apprentices

Training afloat--Maintenance of ships' armament, including
underwater weapons and fire control equipment 100%

36-39 Months -- All Apprentices

Summary of training -- final examinations -- trade testing.

Graduates of the apprenticeship plan are given the rank of Petty Officer Second Class and qualify for Group 3 rating in their respective trades. Any further training and promotion are obtained through the regular channels and procedures.

The foregoing syllabus indicates the high standards of skill and experience required of tradesmen, whether they enter as apprentices or advance from the rank of ordinary seaman. It is apparent that such persons should have little difficulty in obtaining suitable skilled employment when re-entering civilian life.

TRAINING PROGRAMS AND COURSES
FOR CANADIAN GOVERNMENT EMPLOYEES

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